PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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PROPERTY OF
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PRODUCTION CHANGES
BULLETIN 131

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 248

BUICK MODEL 981651

Buick auto radio model 981550 was covered in Photofact Folder 3 - Set 248.

Buick model 981651 (For All 1955 Cars) is identical to model 981550, except for the following:

ELECTRICAL CHANGES

Filament choke (L8) changed to part #7265936.

C14 is increased from .0015MFD to .004MFD, 800V tubular,(part #H-402).

MECHANICAL CHANGES

DESCRIPTION	NEW PART NUMBER
Escutcheon Assembly	7265659
Dial	7265656
Pointer Assembly	1220687
Fuse	455640
Knob, volume	1167355
Knob, dummy	1167477
Knob, tone	1167478

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 257

BUICK MODEL 981652

Buick auto radio model 981551 was covered in Photofact Folder 2 — Set 257.

Buick model 981652 (For All 1955 Cars) is identical to model 981551, except for the following:

ELECTRICAL CHANGES

C17 is increased from .0015MFD to .004MFD, 800V tubular (part #H-402).

R16 is increased from 27KΩ to 47KΩ (part #B-473).

R33 has been omitted on all 1955 models.

MECHANICAL CHANGES

DESCRIPTION	NEW PART NUMBER
Escutcheon Assembly	7265675
Dial	7265679
Gear Train Assembly	7265765
Knob, volume	1167355
Knob, sensitivity	1167479
Knob, tone	1167478

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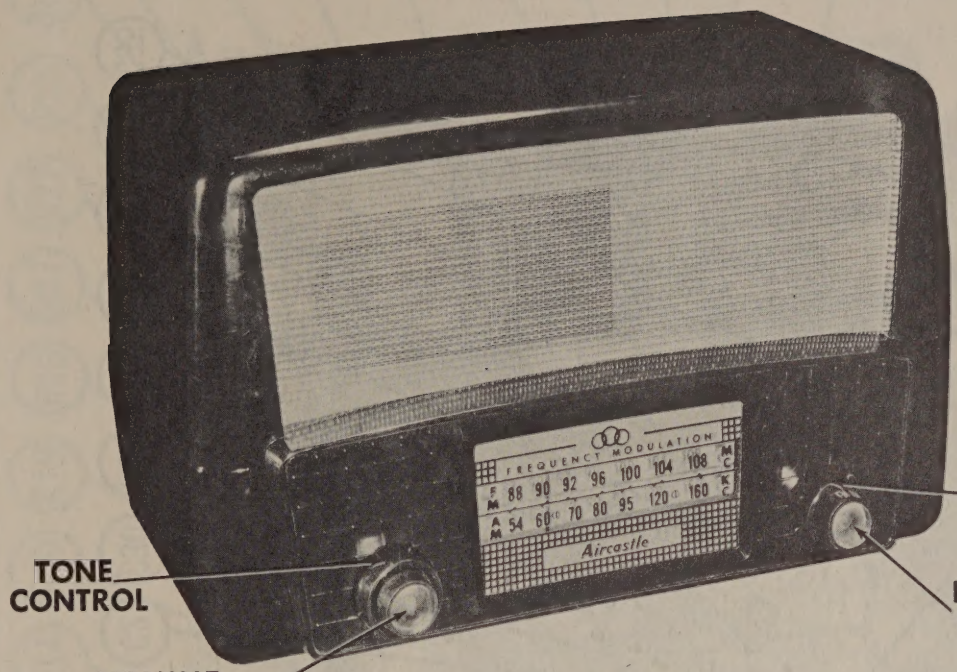
AIRCASTLE MODEL
782.FM-99-AC



AIRCASTLE MODEL
782.FM-99-AC

TRADE NAME	Aircastle Model 782.FM-99-AC		
SUPPLIER	Spiegel, Inc., 1061 W. 35th. St., Chicago 9, Ill.		
TYPE SET	AC Operated AM-FM Superheterodyne Receiver		
TUBES (Nine)	Types 6CB6 FM RF Amp., 12AT7 FM Mixer-Osc., 6BE6 AM Conv., 6BA6 FM-AM IF Amp., 6AU6 2nd. FM IF Amp., 6AL5 Ratio Det., 6AT6 AM Det.-AVC-AF Amp., 6AS5 Output, 5Y3GT Rectifier		
POWER SUPPLY	105-120 Volts AC-60 Cycles	RATING	.47 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535KC-1650KC	FREQ. MOD.	88MC-108MC

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ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	456KC (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output.
2.	"	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	"	"	"	"	A3, A4	"
3.		Loop	1650KC	"	"	"	A5, A6	Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.
4.		"	1500KC	"	Tune to 1500KC signal	"	A7	Adjust for maximum output while rocking tuning gang thru 1500KC signal.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.1MFD	High side to pin 1 (grid) of 6AU6 (V5). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point Ⓒ. Common to chassis.	A9	Adjust for maximum deflection.
6.	"	"	"	"	"	DC probe to point Ⓐ. Common to point Ⓑ.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
7.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A10, A11	Adjust for maximum deflection.
8.	"	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A12, A13	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.1MFD	High side to pin 2 (grid) of 12AT7 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓒ. Low side to chassis.	A9,A10, A11, A12,A13	Disconnect stabilizing capacitor (C2). Adjust for maximum amplitude and symmetry similar to Fig. 1.
6.	"	"	"	"	"	Vert. Amp. to point Ⓐ. Low side to chassis.	A8	Reconnect stabilizing capacitor (C2). Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines. Proceed with step 9.

FM RF ALIGNMENT

Use FM signal generator and VTVM for this alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	Two 150Ω Carbon Resistors	Across FM antenna terminals with 150Ω in each lead.	109MC	FM	Tuning gang fully open	Vert. Amp. to point Ⓒ. Common to chassis.	A14	Adjust for maximum deflection.
10.	"	"	105MC	"	Tune to 105MC signal	"	A15	Adjust for maximum deflection while rocking tuning gang.
11.	"	"	87.5MC	"	Tuning gang fully closed	"	A16	Adjust for maximum deflection.
12.	"	"	98MC	"	Tune to 98MC signal	"		Adjust L4 for maximum deflection by compressing or expanding coil.
13.	"	"	"	"	"	"	A17	Adjust for maximum deflection.

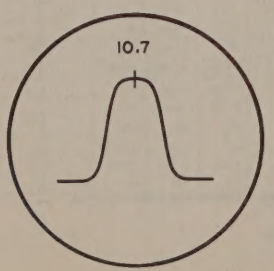


FIG. 1

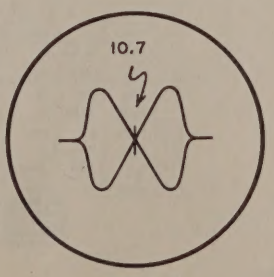


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		AIRCASTLE PART No.	STANDARD REPLACEMENT		
V1	FM RF Amp.	6CB6	6CB6	7CM	
V2	FM Mixer-FM Osc.	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	1st. FM IF Amp.-AM IF Amp.	6BA6	6BA6	7BK	
V5	2nd. FM IF Amp.	6AU6	6AU6	7BK	
V6	Ratio Det.	6AL5	6AL5	6BT	
V7	AM Det.-AVC-AF Amp.	6AT6	6AT6	7BT	
V8	Audio Output	6AS5	6AS5	7CV	
V9	Rectifier	5Y3GT	5Y3GT	5T	

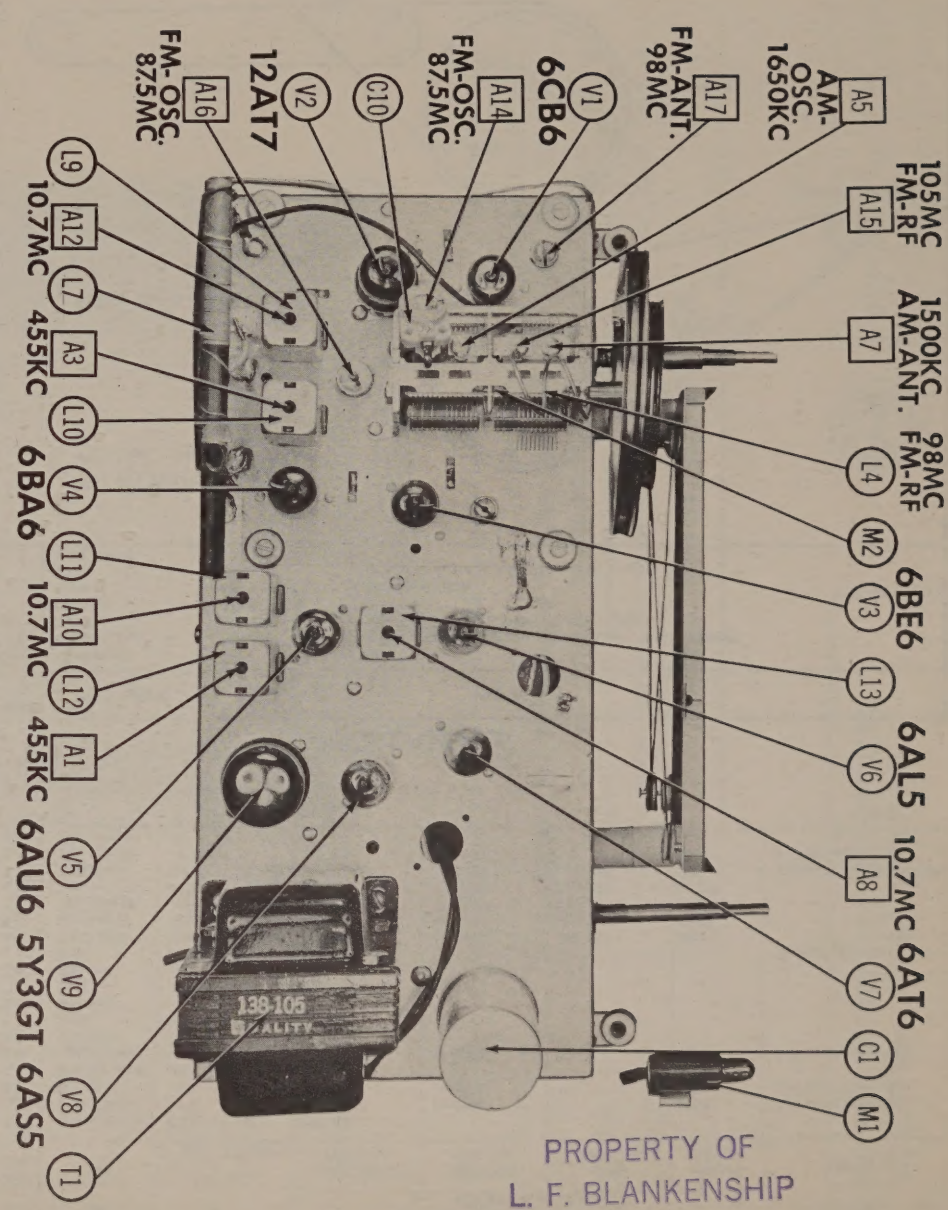
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	AIRCASTLE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■60	350	156-116			FM421.2	TM-4088	Q-017 MT-0510	
B	▲40	350							
C	▲40	300							
D	10	50							
C2	5	50				TC30	TD-5-50	MMT-0505	
C3	5000		158-101	DD-502	811-005	DC-525		C-1250	Note 1
C4	1000		158-106	DD-102	801-001	DC-521		K-1210	
C5	1000		158-106	DD-102	801-001	DC-521		K-1210	
C6	50		156-109	TCN-50	N750L-101	NT-5447			
C7	1		156-110	TCZ-1	NP0A-010				
C8	50		156-109	TCN-50	N750K-500	NT-5447			
C9	50		156-109	TCN-50	N750K-500	NT-5447			
C10	3-12			822-FZ	TS2A-3	ST-553-Z			
C11	1000		158-106	DD-102	801-001	DC-521		K-1210	
C12	10000		158-102	DD-103	811-01	DC-511			Note 3
C13	1000		158-106	DD-102	811-001	DC-521		K-1210	
C14	1000		158-106	DD-102	811-001	DC-521		K-1210	
C15	300		156-101	TCZ-300	NP0-335-301	MCE235		K-1330	
C16	10000		158-102	DD-103	811-01	DC-511			Note 2
C17	.05	200	152-104	DF-503		PT415	IMP2-S5	330215	
C18	10000		158-102	DD-103	811-01	DC-511			Note 3
C19	5000		158-101	DD-502	811-005	DC-525		C-1250	
C20	50		156-109	TCN-50	N750K-500	NT-5447			
C21	5000		158-101	DD-502	811-005	DC-525		C-1250	
C22	5000		158-101	DD-502	811-005	DC-525		C-1250	Note 1
C23	1500	500	156-108			MC256		C-1215	
C24A	470		♦166-106	DD-471	811-471	UC-5347			
B	1000			DD-102	801-001	DC-521			
C	10000			DD-103	811-01	DC-511			
C25	5000		158-101	DD-502	811-005	DC-525		C-1250	
C26A	100		† 166-107	D6-101	801-101	UC-5310		K-1310	
B	100			D6-101	801-101	UC-5310		K-1310	
C27	10000		158-102	DD-103	811-01	DC-511	IMP4-S1	330411	
C28	.005	400	152-110	D6-502	811-005	PT625	IMP6-D5	330625	
C29	100		156-102	TCZ-100	NP0-337-101	UC-5310		K-1310	
C30	.05	200	152-104	DF-503		PT415	IMP2-S5	330215	
C31	.02	400	152-103	DF-203	817-02	PT412	IMP4-S2	330412	Note 4
C32	5000		158-101	DD-502	811-005	DC-525	IMP6-D5	330625	
C33	5000		158-101	DD-502	811-005	DC-525	IMP6-D5	330625	
C34	100		156-102	TCZ-100	NP0-337-101	UC-5310		K-1310	
C35	.05	400	152-105	DF-503		PT415	IMP4-S5	330415	

♦ Items C24A, C24B, C24C, R16A and R16B are combined in one unit.
† Items C34A, C34B and R20 are combined in one unit.
Note 1. Not used in some versions.
Note 2. Some versions may use a .05MFD capacitor in this application.
Note 3. Some versions may use a .005MFD capacitor in this application.
Note 4. Some versions may use a .01MFD capacitor in this application.

CHASSIS—TOP VIEW



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PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	120-115			F1-52	UF-16A	Tone (Panel)
B	1Meg	½				R2-61	UR16-T1253	Volume (Rear) Tapped ⓐ 100KΩ
C	Switch					KB-1	US-26	Attach to R1B

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRCASTLE PART No.	IRC PART No.	
R2	120Ω	½	180-145	BTS-120	
R3	330Ω	½	180-117	BTS-330	
R4	2200Ω	½	180-101	BTS-2200	
R5	330Ω	½	180-117	BTS-330	
R6	15KΩ	½	180-115	BTS-15K	
R7	1000Ω	½	180-106	BTS-1000	
R8	22KΩ	½	180-102	BTS-22K	
R9	2.4Meg 5%	½		BTS-2.4Meg 5%	Note 1
R10	1000Ω	½	180-106	BTS-1000	
R11	68Ω	½	180-149	BTS-68	
R12	330Ω	½	180-117	BTS-330	
R13	500KΩ	½	180-110	BTS-470K	
R14	68Ω	½	180-149	BTS-68	
R15	330Ω	½	180-117	BTS-330	
R16A	120Ω	½	♦166-106	BTS-120	
B	68KΩ	½		BTS-68K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRCASTLE PART No.	IRC PART No.	
R17	15KΩ	½	180-115	BTS-15K	
R18	15KΩ	½	180-115	BTS-15K	
R19	47KΩ	½		BTS-47K	Note 2
R20	47KΩ	½	†166-107	BTS-47K	
R21	2.4Meg 5%	½		BTS-2.4Meg 5%	Note 1
R22	47KΩ	½	180-114	BTS-47K	
R23	6.8Meg	½	180-135	BTS-6.8Meg	
R24	220KΩ	½	180-105	BTS-220K	
R25	120KΩ	½		BTS-120K	Note 3
R26	500KΩ	½	180-110	BTS-470K	
R27	220Ω	1		BTA-220	Note 4
R28	1500Ω	2	180-134	BTB-1500	
R29	4700Ω	½		BTS-4700	Note 2
R30	100Ω	2	180-144		

♦ Items R16A, R16B, C24A, C24B, and C24C are combined in one unit.
† Items R20, C26A, C26B are combined in one unit.
Note 1. Some versions use a 2.2Meg resistor in this application.
Note 2. Not used in some versions.
Note 3. Some versions use a 100KΩ resistor in this application.
Note 4. Some versions use a 200Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRCASTLE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ⓐ.47A	390VCT .080A	6.3VAC ⓐ3.05A		138-105					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AIRCASTLE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4.6KΩ	3.5Ω	138-106	Z1002	A-3019	A-3849	24S51①	S-5Z	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	AIRCASTLE PART No.	QUAM PART No.	
SP1	5"	PM	3.5Ω	175-113	5A1	

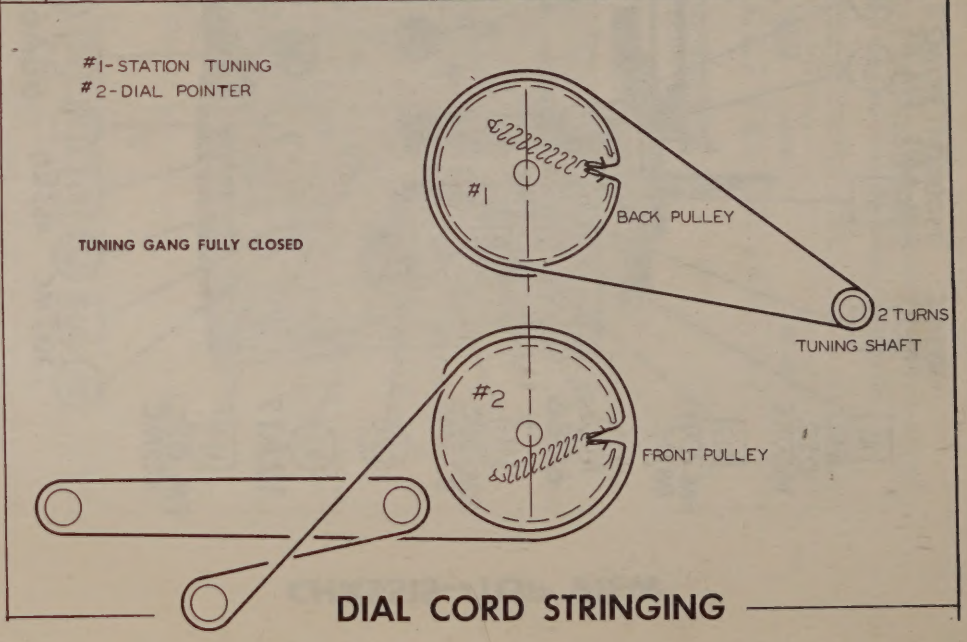
PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRCASTLE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω CT	0Ω	132-108				
L2	Fil. Choke	.7Ω		132-112	19-1003		4608	3.8 Microhenries
L3	RF Choke	.3Ω		132-109	19-1002		4606	2.6 Microhenries
L4	FM RF Coil	0Ω						
L5	Cath. Choke	.3Ω		132-109	19-1002		4606	2.6 Microhenries
L6	FM Osc. Coil	0Ω		136-115				
L7	AM Ant. Coil	.8Ω		132-110				
L8	AM Osc. Coil	9.5Ω		136-116				Tapped ⓐ .8Ω
L9	1st. FM IF	.6Ω	.6Ω	130-108	16-3487	FM-254	1463	
L10	1st. AM IF	17Ω	17Ω	130-102	16-6758	BC-352	12-C1	
L11	2nd. FM IF	.6Ω	.6Ω	130-109	16-3487	FM-254	1463	
L12	2nd. AM IF	8.5Ω	8.5Ω	130-107	16-6758	BC-353	12-C2	
L13	Ratio Det.	1.5Ω	.8ΩCT	130-110	17-3492	FM-255	1465	Tertiary winding=.4Ω
L14	Fil. Choke	.7Ω		132-112	19-1003		4608	3.8 Microhenries
L15	Line Choke	0Ω						

MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
M1	Dial Light		#47
M2	Tuning Cap.	160-109	4 Gang (AM sections - 27-425MMF, 35-237MMF)
M3	Switch	125-108	AM-FM-Phono (3 Pole - 3 Position)
	Cabinet	210-106	
	Knob	220-119	Tuning & tone
	Knob	220-120	On-off-volume & AM-FM-phono switch
	Dial Glass	215-120	



DIAL CORD STRINGING

PHOTOFACT* Folder

*TRADE MARK

AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG-5103B

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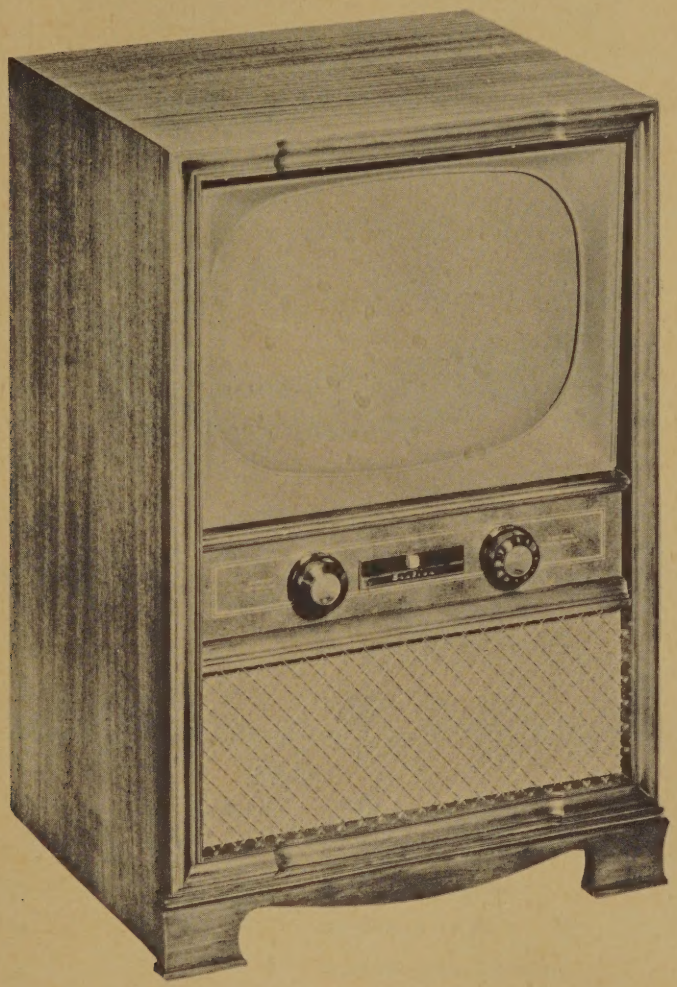

MODEL WG 5003C

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DATE 9-55 SET 290 FOLDER 3

PHOTOFACT* Folder

AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG-5103B

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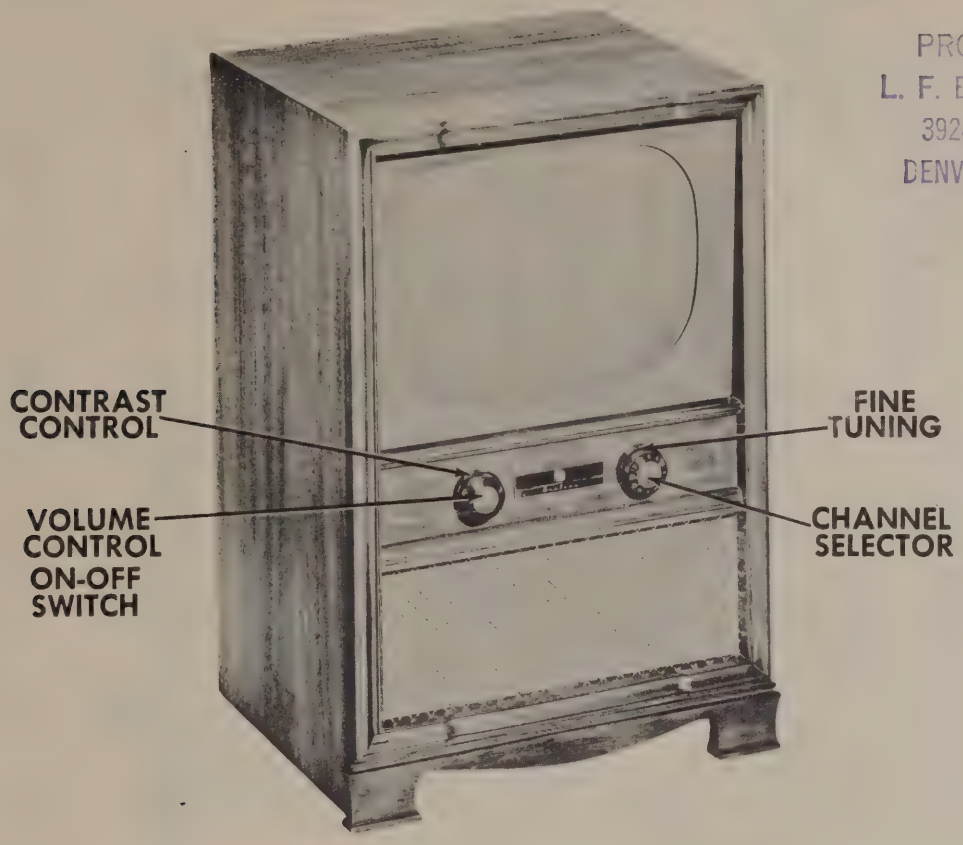

AIRLINE MODEL WG-5003C

TRADE NAME	Airline Models WG-5002C, WG-5003C, WG-5102B, WG-5103B
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Television Receiver
TUBES	Twenty-three
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.64 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG-5103B

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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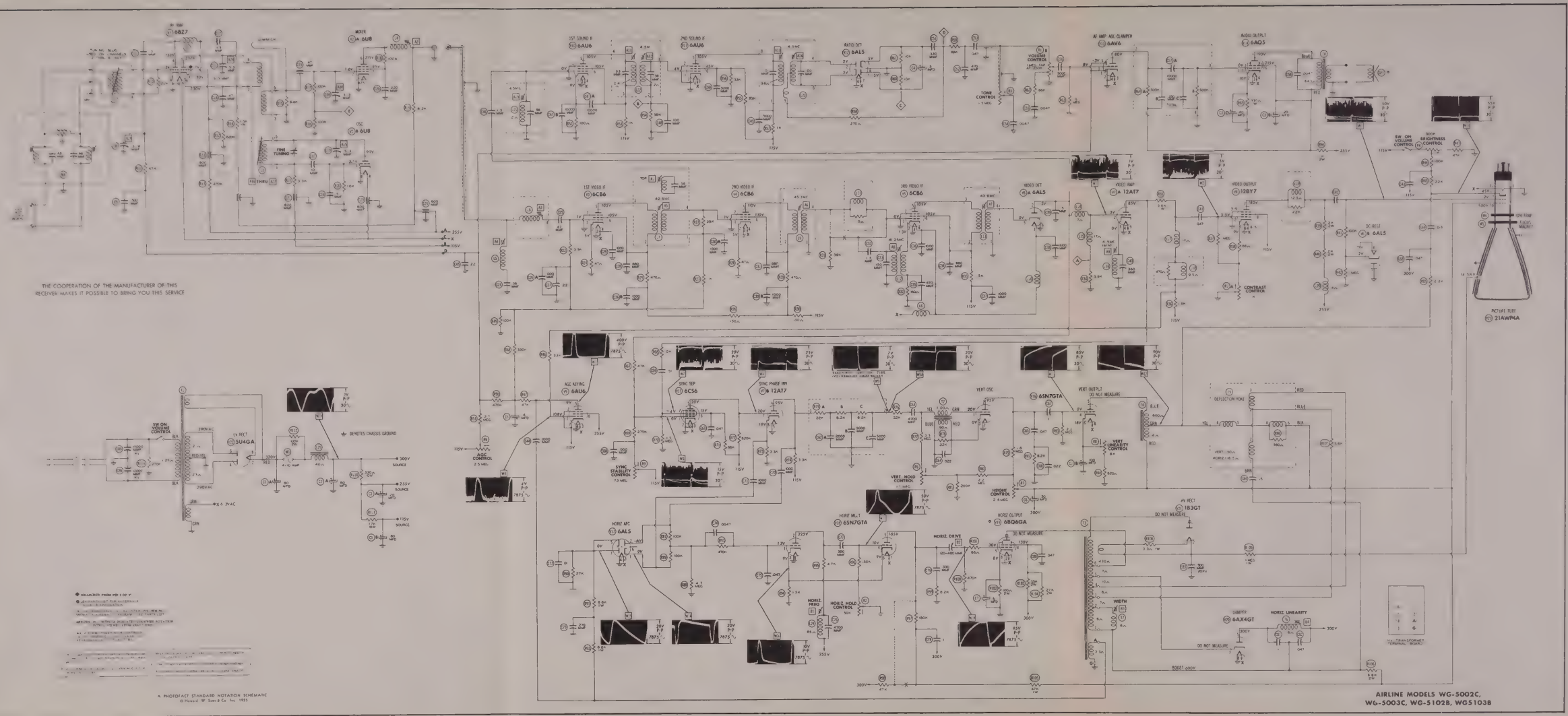
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG5103B
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG5103B

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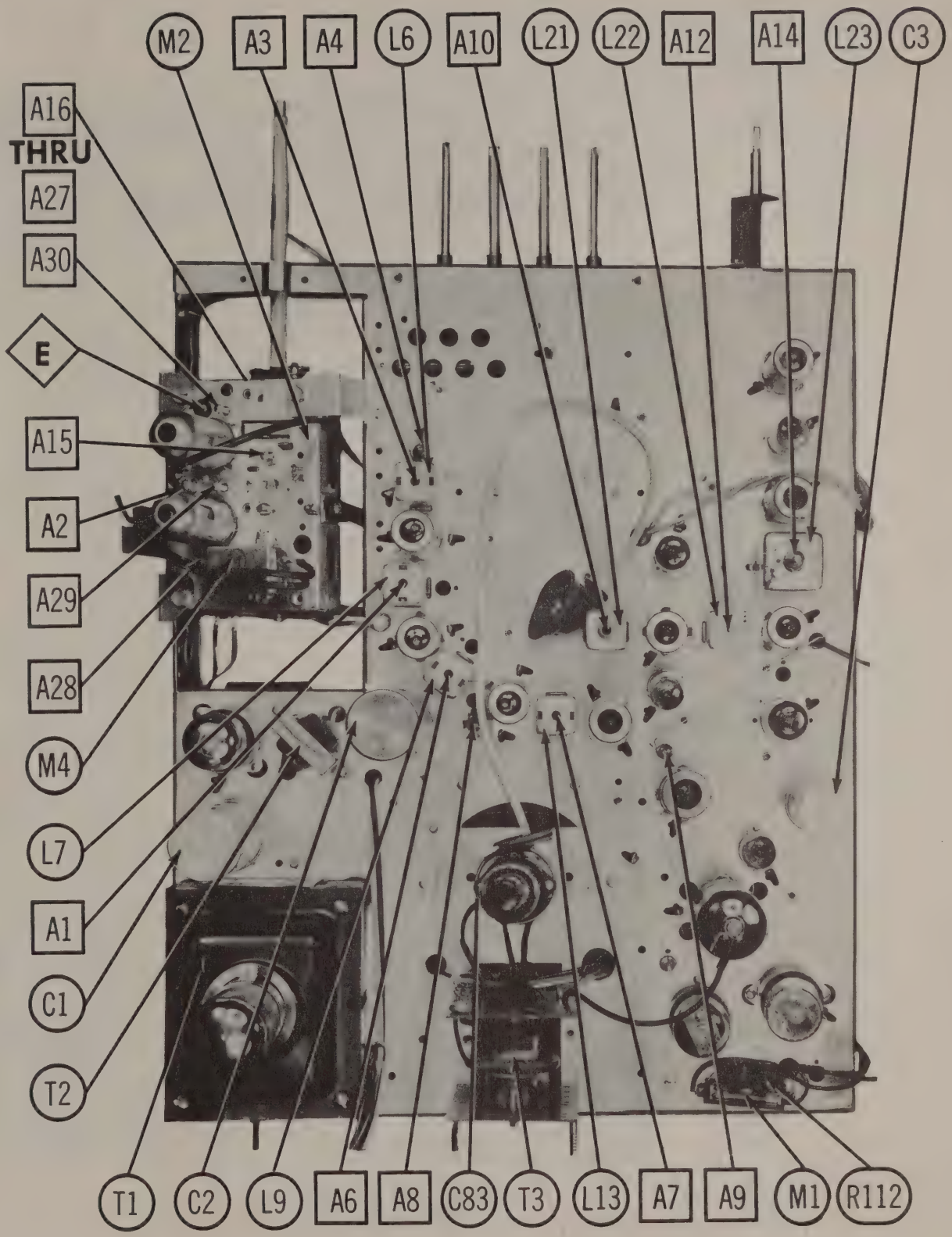

CHASSIS TOP VIEW

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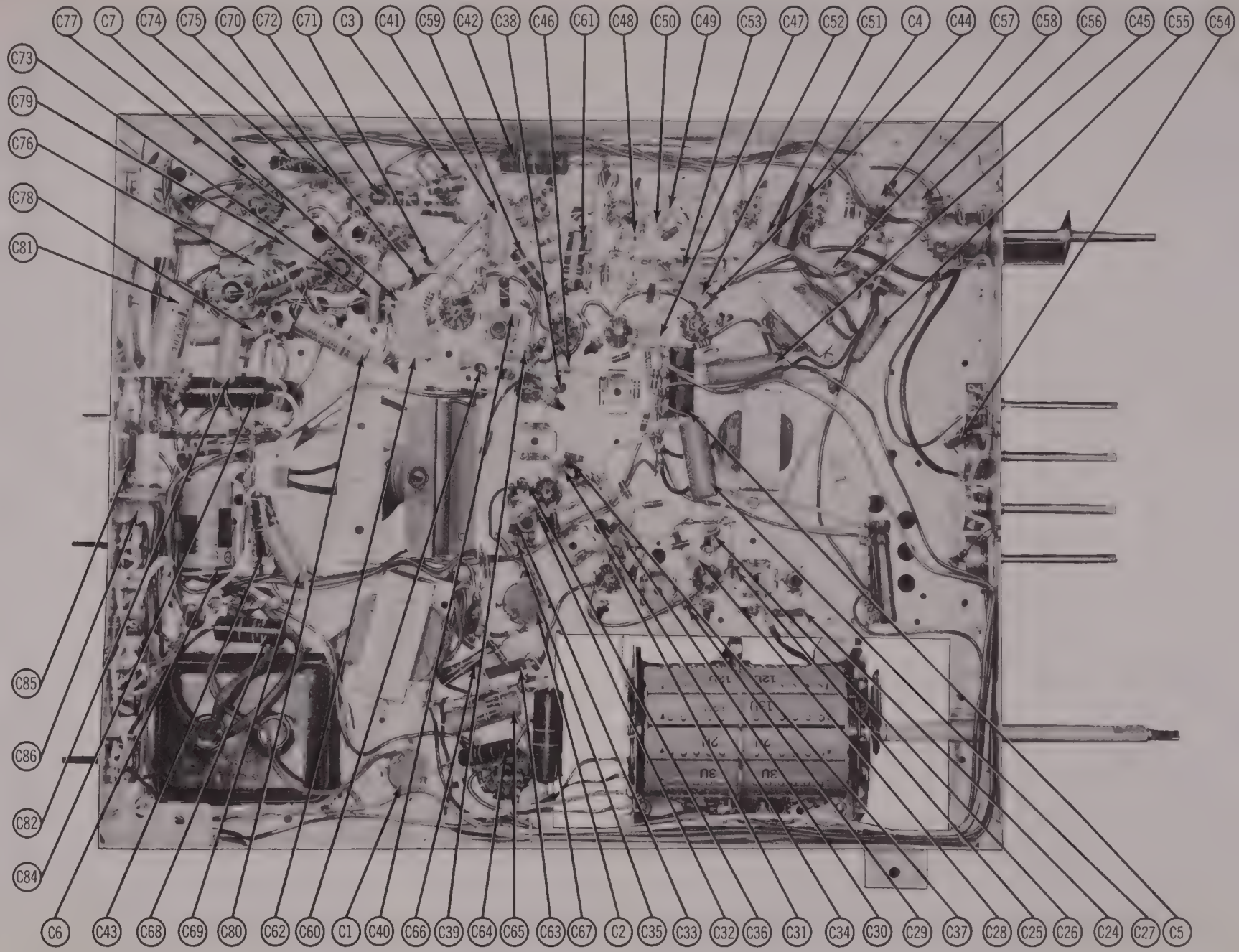

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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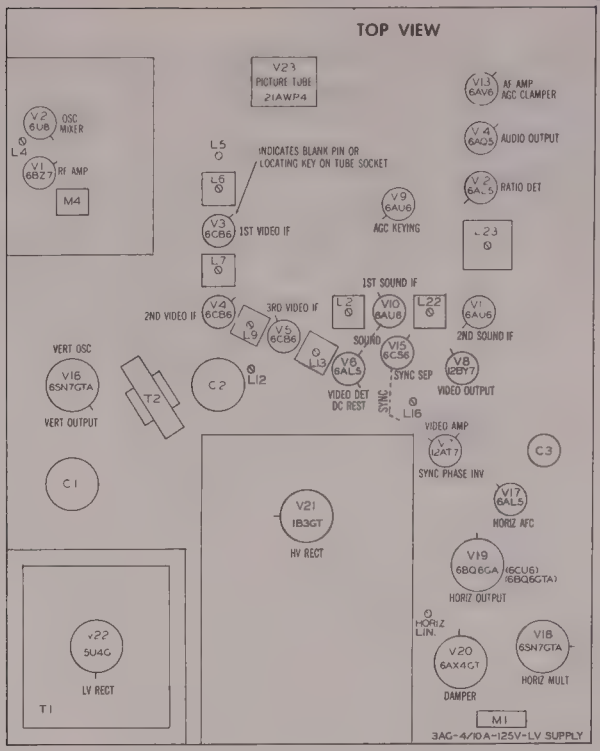
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V22, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V8, V9, V23
Has pic, no sound - V10, V11, V12, V13, V14
Overloaded picture - V9, V13

SYNC FAILURE
No vert. sync - V7, V16
No horiz. sync - V7, V17, V18
No vert. or horiz. sync - 7, V15

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V23
No vertical deflection - V16
Poor vert. linearity or foldover - V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, V22
Vert. off freq. - V7, V16
Horiz. off freq. - V7, V17, V18

AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG5103B

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5V battery to the ungrounded side of C27. Connect the positive lead to chassis.
Remove the converter tube (V2) from its socket and replace with a 6U8 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
An alternate method of disabling the local oscillator is to place a piece of transparent tape on the first two contacts (from front of drum assembly) of any channel and then switch to the insulated strip.
Use only enough generator output to produce usable indication on scope or VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC 47.25MC	Any	Vert. Amp. thru detector (Fig. 1) to pin 5 of 6CB6 (V3). Low side to chassis.	A1, A2, A3, A4	Adjust A1 to place 47.25MC marker in trap notch as in Fig. 2. Adjust A2, A3 and A4 for response similar to Fig. 2. A2 and A3 affect the flat portion of curve. A4 positions the 41.25MC marker. Make sure 45.75MC marker is on peak of curve as shown or 44.5MC marker on overall response will be incorrect.
2.	"	"	Not used	42.5MC (Unmod)	"	Usd VTVM. DC probe to point Ⓐ. Common to chassis	A5	Increase bias from 1.5 volts to 4.5 volts at ungrounded side of C27. Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	"	45.3MC (Unmod)	"	"	A6	"
4.	"	"	"	43.9MC (Unmod)	"	"	A7	"
5.	"	"	"	41.25MC (Unmod)	"	"	A8	"
6.	"	"	44MC (10MC Swp)	41.25MC 42.25MC 42.5MC 43.9MC 44.5MC 45.3MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point A. Low side to chassis.		Check for response curve similar to Fig. 3. SLIGHTLY retouch A5 thru A8 to obtain desired response. If A1 thru A4 requires retouching, step 1 should be repeated.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V6A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to pin 2 (grid) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Remove the dummy converter tube and replace the original 6U8 in its socket or remove cellulose tape from tuner strip.
Remove bias supply.
Tune in a TV station and adjust A9 for minimum 4.5MC beat interference in picture.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove 6CB6 (V5) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V6A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ. Common to chassis.	A10, A11, A12	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A13	Use only enough signal generator output to provide usable indication on VTVM. Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point Ⓓ. Common to chassis.	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V5 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove 6CB6 (V5) from its socket.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (Plate) of 6AL5 (V6A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A10, A11, A12,	Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
9.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A13	Disconnect stabilizing capacitor C4. Use only enough sweep generator output to provide usable indication on scope. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
10.	"	"	"	"	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A14	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 5. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

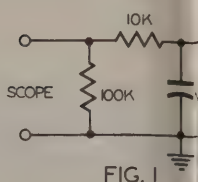


FIG. 1

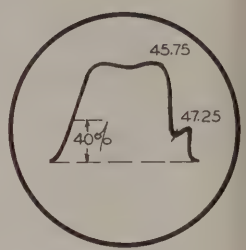


FIG. 2

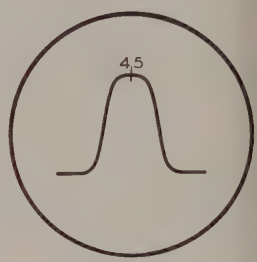


FIG. 4

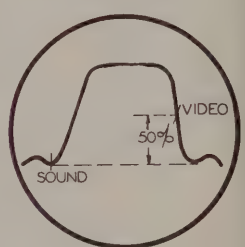


FIG. 6

FROM
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DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5V battery to the ungrounded side of C37. Connect the positive lead to chassis.
Remove the converter tube (V2) from its socket and replace with a 6U8 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
As alternate method of disabling the local oscillator is to place a piece of transparent tape on the first two contacts from front of drum assembly) of any channel and then switch to the insulated strip.
Use only enough generator output to produce usable indication on scope or VTVM.
Connect the synchronised sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC 47.25MC	Any	Vert. Amp. thru detector (Fig.1) to pin 5 of 6CB6 (V3). Low side to chassis.	A1, A2, A3, A4	Adjust A1 to place 47.25MC marker in trap notch as in Fig. 3. Adjust A3, A3 and A4 for response similar to Fig. 2. A2 and A3 affect the flat portion of curve. A4 positions the 41.25MC marker. Make sure 45.75MC marker is on peak of curve as shown or 44.5MC marker on overall response will be incorrect.
2.	"	"	Not used	43.5MC (Unmod)	"	Used VTVM. DC probe to point Ⓐ Common to chassis	A5	Increase bias from 1.5 volts to 4.5 volts at ungrounded side of C37. Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	"	45.9MC (Unmod)	"	"	A6	"
4.	"	"	"	43.9MC (Unmod)	"	"	A7	"
5.	"	"	"	41.25MC (Unmod)	"	"	A8	"
6.	"	"	44MC (10MC Swp)	41.25MC 42.25MC 42.5MC 43.9MC 44.5MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point A. Low side to chassis.		Check for response curve similar to Fig.3. SLIGHTLY retouch A5 thru A8 to obtain desired response. If A1 thru A4 requires retouching, step 1 should be repeated.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V6A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to pin 3 (grid) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Remove the dummy converter tube and replace the original 6U8 in its socket or remove cellulose tape from tuner strip.
Remove bias supply.
Tune in a TV station and adjust A9 for minimum 4.5MC beat interference in picture.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove 6CB6 (V5) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V6A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point Ⓑ. Common to chassis.	A10, A11, A12	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A13	Use only enough signal generator output to provide usable indication on VTVM. Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point Ⓓ. Common to chassis.	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V5 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove 6CB6 (V5) from its socket.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (Plate) of 6AL5 (V6A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point Ⓑ. Low side to chassis.	A10, A11, A12,	Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
9.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A13	Disconnect stabilizing capacitor C4. Use only enough sweep generator output to provide usable indication on scope. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
10.	"	"	"	"	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A14	Reconnect stabilizing capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

FIG. 1

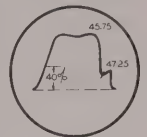


FIG. 2

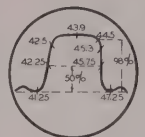


FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 4.5 volt battery to the ungrounded side of C37.
Connect positive lead to chassis.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency the same amount for a majority of the channels it may be possible to correct them in one step using A15 adjustment. It should be noted that this is an all channel oscillator circuit adjustment, and should not be used to correct any individual channel. If adjustment of A15 will not bring all channels well within range of the fine tuning control it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency.
The channel oscillator adjustment screws are reached thru a hole just to the left of the channel switch shaft.
The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Remove the dummy converter tube and replace original 6U8 in its socket or remove cellulose tape from tuner strip.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A16	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A17	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A18	
			193MC (10MC Swp)	191.25MC 197.75MC	10		A19	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A20	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A21	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A22	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A23	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A24	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A25	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A26	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A27	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C45. Connect positive lead to chassis ground.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A28, A29, A30	Adjust for response curve similar to Fig.7 with markers above 90%.
13.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel make compromise adjustment of A28, A29 and A30 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF TUNER ALIGNMENT

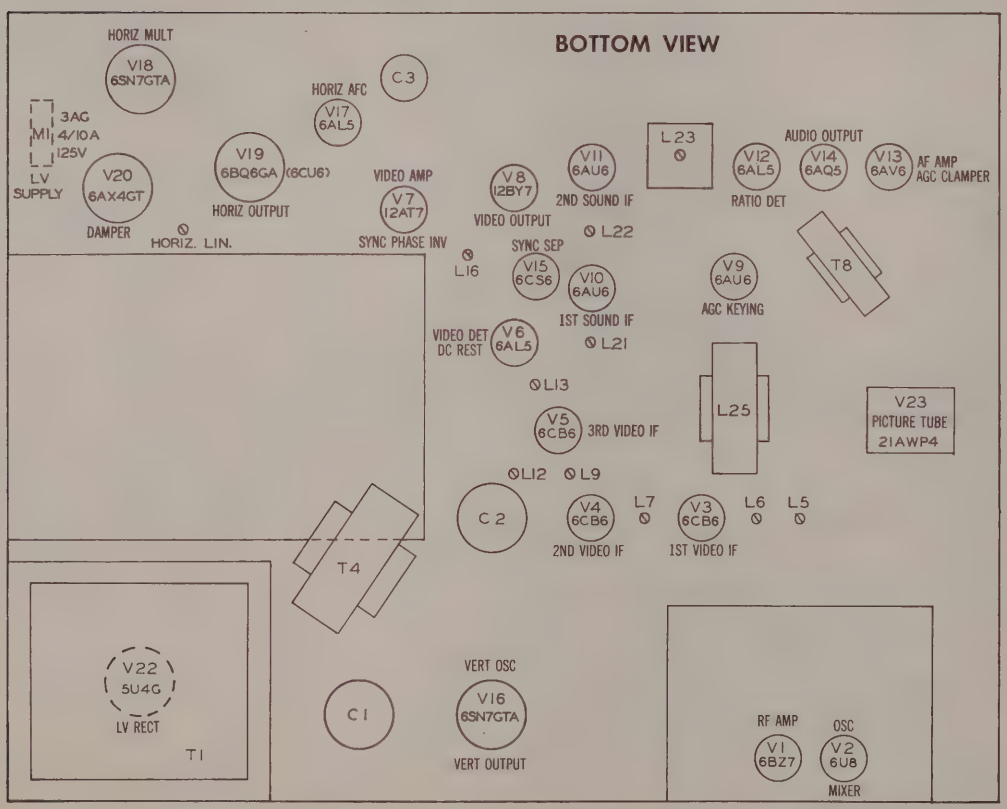
This portion of the set has been properly aligned at the factory.
Alignment of this portion is not recommended in the field.

AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG5103

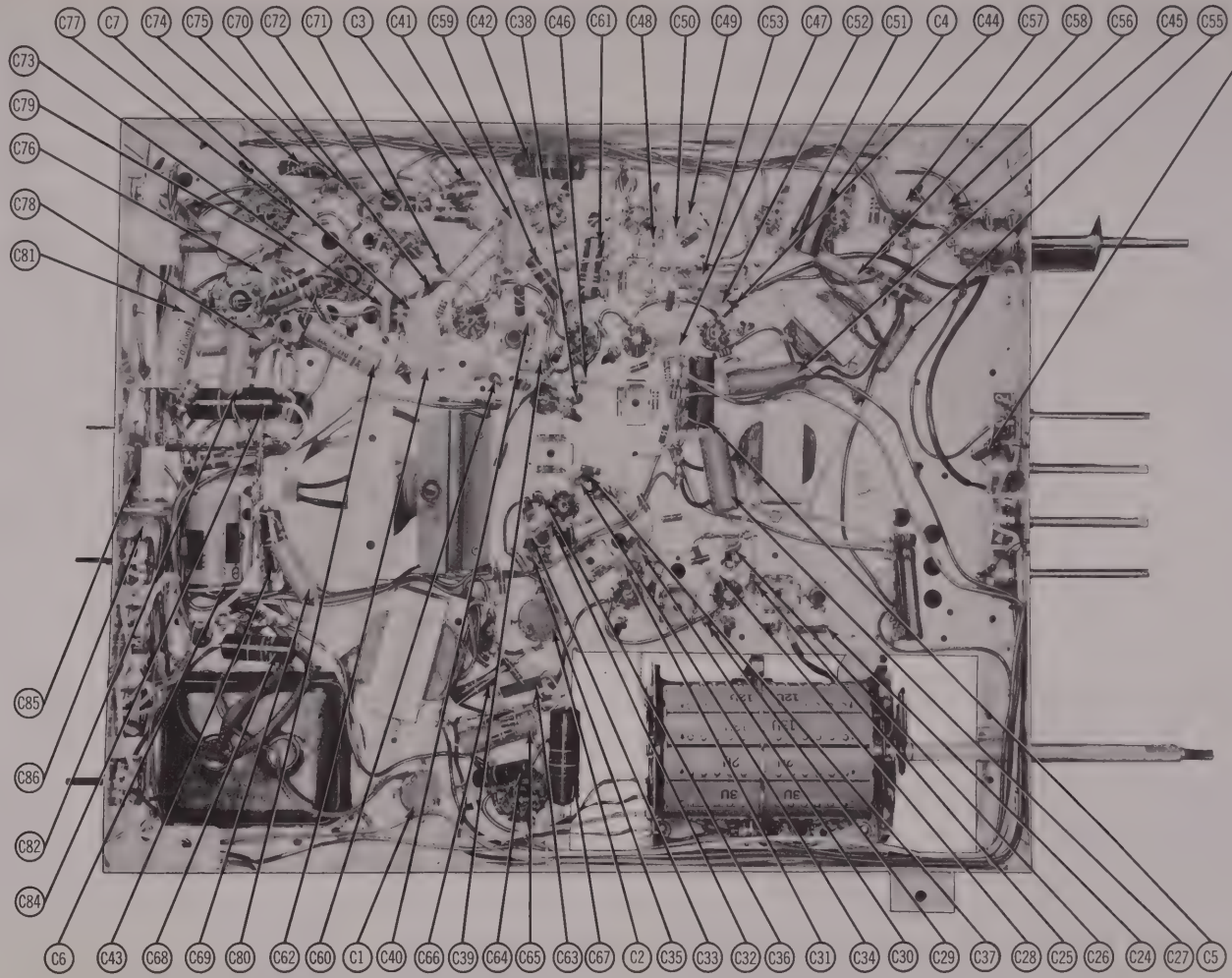
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†1. 8KΩ	300KΩ	INF	0Ω	. 1Ω	INF	1Meg	0Ω	†1. 8KΩ
V 2	6U8	†5. 3KΩ	200KΩ	†100KΩ	. 1Ω	0Ω	†8. 2KΩ	0Ω	0Ω	10KΩ
V 3	6CB6	100KΩ	47Ω	0Ω	. 1Ω	†2. 8KΩ	†2. 8KΩ	0Ω		
V 4	6CB6	100KΩ	47Ω	0Ω	. 1Ω	†2. 7KΩ	†2. 7KΩ	0Ω		
V 5	6CB6	. 1Ω	180Ω	0Ω	. 1Ω	†3. 5KΩ	†3. 5KΩ	0Ω		
V 6	6AL5	1Meg	3. 9KΩ	. 1Ω	0Ω	. 4Ω	0Ω	0Ω		
V 7	12AT7	†9KΩ	3. 9KΩ	. 2Ω	0Ω	0Ω	†5. 3KΩ	†820KΩ	3. 3KΩ	. 1Ω
V 8	12BY7	450Ω	1Meg	0Ω	. 1Ω	. 1Ω	0Ω	†4KΩ	†2. 1KΩ	0Ω
V 9	6AU6	†36KΩ	†2. 1KΩ	. 1Ω	0Ω	500KΩ	†400Ω	†2. 1KΩ		
V 10	6AU6	2Ω	0Ω	0Ω	. 1Ω	†3KΩ	†3KΩ	100Ω		
V 11	6AU6	56KΩ	0Ω	. 1Ω	0Ω	†3KΩ	†30KΩ	0Ω		
V 12	6AL5	INF	INF	. 1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 13	6AV6	10Meg	0Ω	. 1Ω	0Ω	850KΩ	850KΩ	†500KΩ		
V 14	6AQ5	500KΩ	330Ω	0Ω	. 1Ω	†2KΩ	†1. 4KΩ	500KΩ		
V 15	6CS6	50KΩ	0Ω	. 1Ω	0Ω	†820KΩ	†68KΩ	1. 5Meg		
V 16	6SN7GTA	4Meg	▲2. 5Meg	190Ω	2. 2Meg	▲8. 5KΩ	2KΩ	0Ω	. 1Ω	
V 17	6AL5	4. 8Meg	4. 8Meg	. 1Ω	0Ω	10KΩ	NC	10KΩ		
V 18	6SN7GTA	5Meg	†5KΩ	1. 5KΩ	160KΩ	†230KΩ	1. 5KΩ	. 1Ω	0Ω	
V 19	6BQ6GA	TP	0Ω	TP	†15KΩ	470KΩ	TP	. 1Ω	100Ω	Top Cap ▲17Ω
V 20	6AX4GT	TP	NC	150KΩ	TP	†65Ω	NC	. 1Ω	0Ω	
V 21	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ▲450Ω
V 22	5U4GA	INF	50KΩ	INF	23Ω	INF	21Ω	INF	50KΩ	
V 23	21AWP4	0Ω	1Meg	Pin 10 ▲6. 8KΩ	Pin 11 †250KΩ	Pin 12 . 1Ω				

† MEASURED FROM PIN 2 OF V22.
▲ MEASURED FROM PIN 3 OF V20.
TP - TIE POINT
NC - NO CONNECTION

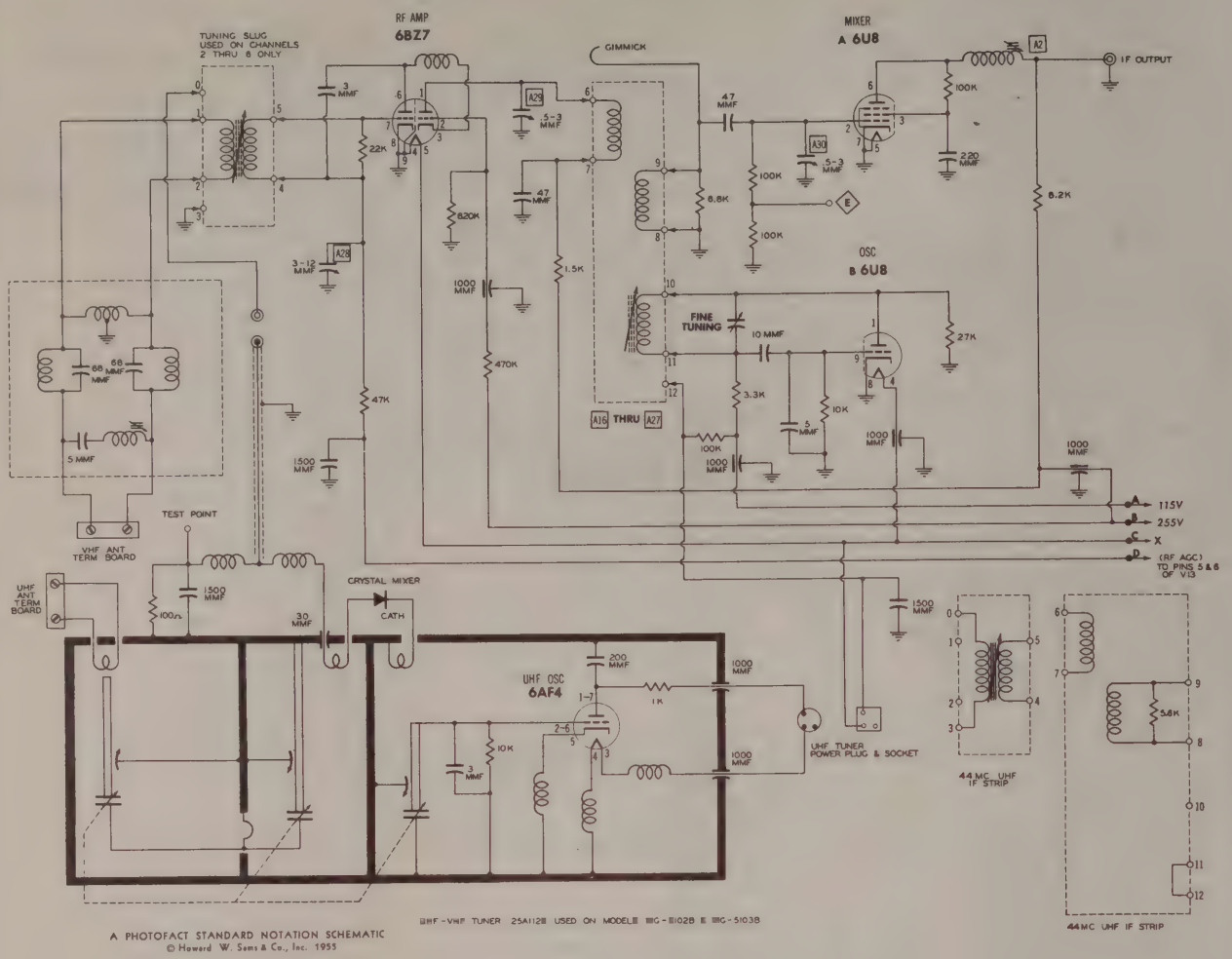


TUBE PLACEMENT CHART

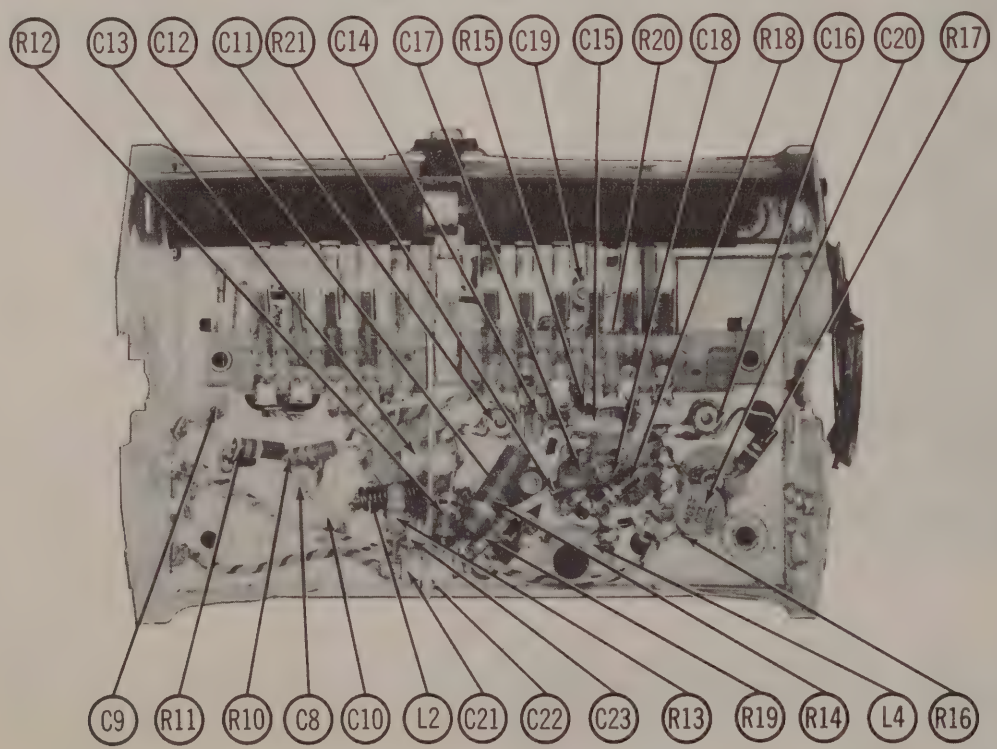


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

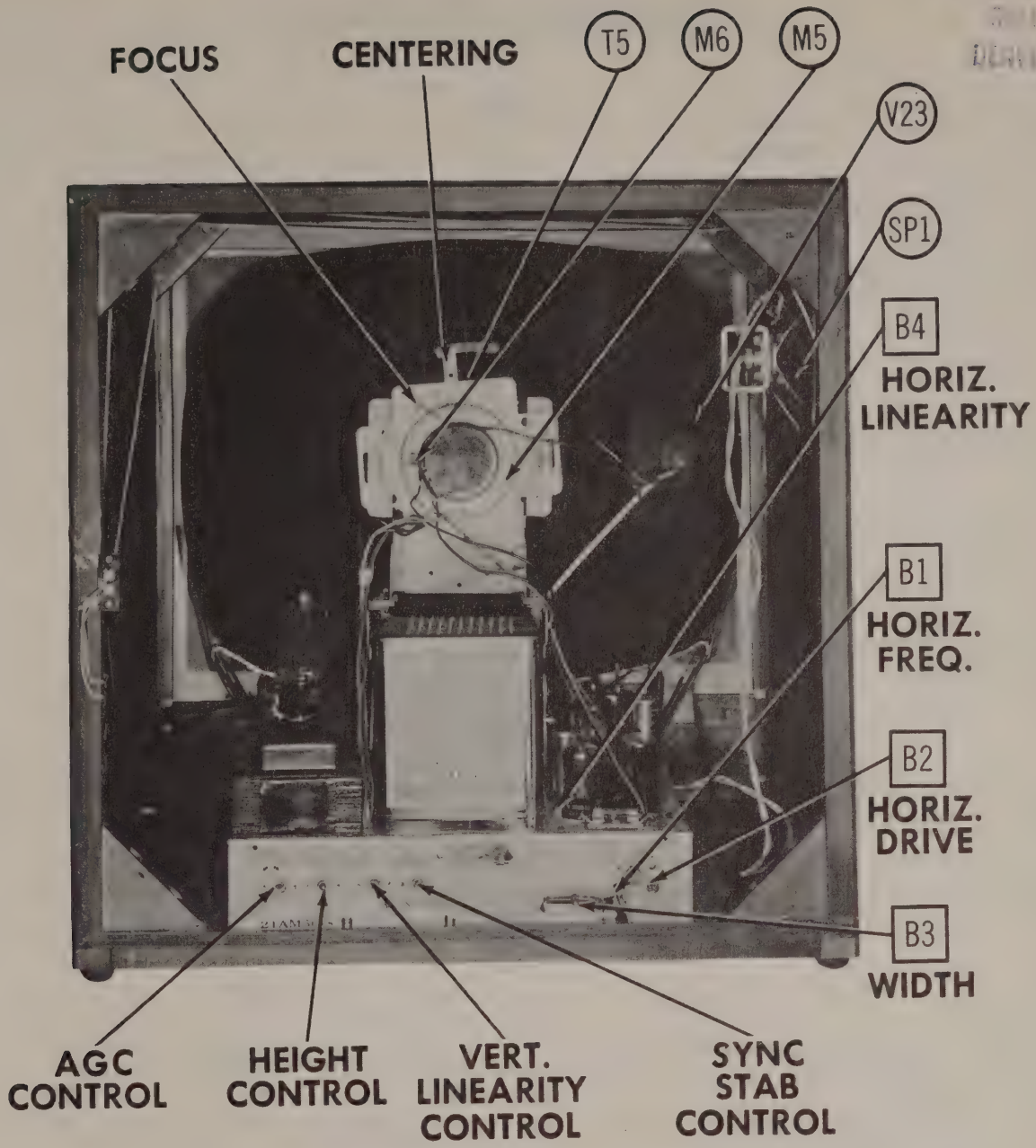
PROPERTY OF
L. F [illegible] SHIP
3924 MEADE ST.
DENVER, COLORADO



ALTERNATE TUNER SCHEMATIC



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station preferably a test pattern.

IF horizontal hold control fails to maintain sync, set it in the middle of its range and adjust the horizontal frequency slug (B1) until the picture is in sync. Check other channels and if necessary readjust B1 slightly for best sync on all channels. With picture locked in sync turn contrast control to minimum contrast and adjust brightness control for a washed out picture. Adjust the width control (B3) for a picture slightly wider than necessary to fill the mask horizontally.

Turn the horizontal drive timmer (B2) inward (if necessary) until horizontal drive line disappears.

Adjust the horizontal linearity control (B4) for a picture that is symmetrical from left to right.

Adjust the picture centering device located in front of focus magnet to center picture in the mask.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss Of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V19, V20 and V22. Check adjustments B2, B3 and B4. Check T3, T5A, R103, R104, R99, C79, C7 and other associated components.

DRIVE LINES

Check by substitution V19 and V20. Check adjustments B2 and B4. Check R103, R104 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V19 and V20. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V18, V19 and V20. Check C75 for open. Check L24, C76, R94 and other associated components.

XMAS TREE EFFECT

Check by substitution V18, V19 and V20. Check T3 and T5 for internal arcing. Check C72, C74, C76, C77, L24, R90, R95 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V16. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R8, R84 and other associated components.	Check T2, R77, R79, R106, R7, C64, C67 and other associated components.

INSUFFICIENT SWEEP

Substitute V16. Check height and vertical linearity controls for proper operation. Check R79, T4 and other associated components.

COMPRESSED AT BOTTOM

Substitute V16. Check R79, R80, R106, R7, C67 and other associated components.

COMPRESSED AT TOP

Substitute V16. Check R8, R84, C2B, C67, T4 and other associated components.

FOLDS

Substitute V16. Check C65, C66, C67, R82, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V15 and V7. Check C59, C61, R71, R72, R74 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V16. Check vertical integrator network. Check C63, C64, R78, R77, R5, T2 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check C70, C71, C76, L24, R95 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V15, V17 and V18. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check R35, R36, R39, R40, C41, C42, L20, L17 and other associated components.

SOUND BARS(4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9. Check Video IF Alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check contrast control. Check L18, L19, C41, C42 and other associated components.

NEGATIVE PICTURE

Check by substitution V7 and V8. Check picture tube. Check C41, C42, R38 and other associated components.

SMEAR

Check by substitution V7 and V8. Check L14, L15, L18, L19, C41, C42 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12, V13 and V14. Check stages V13 and V14 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C53, C56, C57, C58, C3B, C3C, R66, R65, R64, T8, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A14 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak Or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V22. Check M1 fuse. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V22. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Mixer-Osc.	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Det.- DC Restorer	6AL5	6AL5	6BT	
V7	Video Amp.- Sync Phase Inv.	12AT7	12AT7	9A	
V8	Video Output	12BY7	12BY7	9BF	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V11	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V12	Ratio Det.	6AL5	6AL5	6BT	
V13	AF Amplifier- AGC Clamper	6AV6	6AV6	7BT	
V14	Audio Output	6AQ5	6AQ5	7BZ	
V15	Sync Separator	6CS6	6CS6	7CH	
V16	Vert. Oscillator- Vert. Output	6SN7GTA	6SN7GTA	8BD	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V19	Horiz. Output	6BQ6GA	6BQ6GA	6AM	6CU6, 6BQ6TA used as alternate
V20	Damper	6AX4GT	6AX4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4GA	5U4GA	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: AIRLINE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V23	21AWP4 ①	21AWP4 ①	21AWP4 ①	21AWP4 ②	21AWP4 ①	12N	① Aluminized ② Silver Screen

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	▲80	400	45X390			FP229.4	TM-D80-450	T-180	
B	▲60	400							
C2A	▲80	400	45X391			FP229.8	TM-3057	T-720	
B	▲100	50							
C3A	▲20	400	45X392			FP234	TM-D20-450	D-215	
B	▲20	400				TC39	TD-50-50	FM-0550	
C	40	50							
C4	5	25				TC30	TD-5-25	MMT-0505	
C5	4	100	45X361			TC40	TD-4-150	FM-1504	
C6	30	400				TC77	TD-30-450	FM-4530	
C7	5	25				TC30	TD-5-25	MMT-0505	
C8	3-9		31A-079	829-10					
C9	1500			DD-152	801-0015	DC-5215			
C10	3		13L-8C030K	TCZ-3R3	NP0A-030	ZT-5533			
C11	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A			
C12	1.5		13L-8C1R5C	TCZ-1R5	NP0A-1R5	ZT-5515			
C13	800								
C14	47		13L-8Q470K	DD-470	831-470	UC-5447			
C15	47		13M-20U470K-R	MFT-50					
C16	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A			
C17	10		13L-8T100A	TCN-10	N750K-100	NT-541			
C18	5		13L-8UA050C						
C19	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A			
C20	220		13L-12D221K	DD-221	811-221	UC-5322			
C21	800								
C22	800								
C23	800								
C24	36		47X626						
C25	47			D6-470	GP1K-470	UC-5447		K-1447	
C26A	1000			DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C27	.22	200	RCP10M2224M			PT4022	IMP4-P22	3304022	
C28	680			DD-681	811-681	UC-5368		K-1368	
C29	1000			DD-102	801-001	DC-521		K-1210	
C30A	1000			DD2-102	812-001	DCD-521		K-1210	
B	1000							K-1210	
C31	680			DD-681	811-681	UC-5368		K-1368	
C32	1.5			TCZ-1R5	NP0A-1R5	ZT-5515			
C33	150	500	RCM15E151K	D6-151	811-151	MCB236		KR-1315	
C34	680			DD-681	811-681	UC-5368		K-1368	
C35	470		80X4	DD-471	831-471	UC-5347		K-1347	
C36	1000			DD-102	801-001	DC-521		K-1210	
C37	1000			DD-102	801-001	DC-521		K-1210	
C38	1000			DD-102	801-001	DC-521		K-1210	
C39	5		47X562	TCZ-4R7	NP0A-050	ZT-555		KR-1550	
C40	360	500	47X568		811-361			KR-1336	
C41	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C42	.1	400		DF-104		PT401	IMP4-P1	330401	
C43	.1	200		DF-104		PT401	IMP2-P1	330201	
C44	1000			DD-102	801-001	DC-521	IMP6-D1	K-1210	
C45	.22	200	RCP10M2224M			PT4022	IMP4-P22	3304022	
C46	1.5			TCZ-1R5	NP0A-1R5	ZT-5515			
C47A	10000		80X6	DD3-103	811-01	DC-511			
B	10000				811-01	DC-511			
C48	100			D6-101	GP1K-101	UC-531		K-1310	
C49	5000			DD-502	811-005	DC-525		C-1250	
C50	5000			DD-502	811-005	DC-525		C-1250	
C51	330	500	47X570	D6-331	811-331	UC-5333		K-1333	
C52	470	500	47X525	D6-471	GP2K-471	MC245		K-1347	
C53	.047	200		DF-503		PT4147	IMP2-S47	3302147	
C54	.0047	400		D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	

PROPERTY OF
F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESC

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA AIR LINE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C55	.0047	400		D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C56	5000			DD-502	811-005	DC-525	IMP6-D5	C-1250	
C57A	10000								
B	250		†76X5	†PC-80	†1404-01				
C									
C58	.0047	600		D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C59	.01	400		D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C60	1000			DD-102	801-001	DC-521		K-1210	
C61	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C62A	2000					DC-522	IMP6-D2	C-1220	
B	5000		♦76X7	♦PC-100	♦1405-01	DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C63	4700	500	47X543			MCB465		CR-1247	
C64	.022	200		DF-203	817-02	PT4122	IMP4-S22	3304122	
C65	.047	600		DF-503		PT6147	IMP6-S47	3306147	
C66	.022	200		DF-203	817-02	PT4122	IMP4-S22	3304122	
C67	.1	600		DF-104		PT601	IMP6-P1	330601	
C68	.047	600		DF-503		PT6147	IMP6-S47	3306147	
C69	.015	600	RCP10M6153M	DD16-153		PT6115	IMP6-S15	3306115	
C70	1000			DD-102	801-001	DC-521	IMP6-D1	K-1210	
C71	1000			DD-102	801-001	DC-521	IMP6-D1	K-1210	
C72	.01	400		D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C73	270	500		D6-271	811-271	MC241		K-1327	
C74	.0047	400		D6-472	GP2-333-472	PT6247	IMP6-D47	3306247	
C75	.047	200		DF-503		PT4147	IMP2-S47	3302147	
C76	4700	500	47X543			MCB465		CR-1247	
C77	390	500	RCM20B391J	D6-391	811-391	MCB243		KR-1339	
C78	.1	400		DF-104		PT401	IMP4-P1	330401	
C79	330	500	47X570	D6-331	811-331			KR-1333	
C80	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C81	.1	400		DF-104		PT401	IMP4-P1	330401	
C82	.047	400		DF-503		PT4147	IMP4-S47	3304147	
C83	500	20000	47X560	TV3-502	413	HV20035A			
C84	.15	400	RCP10M4154M			PT4015	IMP4-P15	3304015	
C85	10000	1000		DD-103					
C86	10000	1000		DD-103					

† Items C57A, C57B, C57C, R64A, R64B are combined in one unit.
When replacing items separately C57B and C57C should total 250MMF.
♦ Items C62A, C62B, C62C, R57A, R75B and R75C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	B76X21	*QJ-638	RTV-502	F1-4	UF13L	Contrast - Panel
B	1Meg	½				R2-59	UR16-T254	Volume tapped at 250KΩ - Rear
C	Switch					KB-2	US-27	Attach to R1B
R2A	50KΩ	½	B40X361-C	Q11-123	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	NQ	RS-3/16	AK-4	Not Req.	Attach to R2A
R3A	1.5Meg	½	B40X334-E	Q11-138	A47-1.5Meg-S	AB-75	U-155	Tone
B	Shaft		Not Req.	NQ	RS-3/16	AK-4	Not Req.	Attach to R3A
R4A	500KΩ	½	B40X333-A	Q11-133	A47-500K-S	AB-59	U-50	Brightness
B	Shaft		Not Req.	NQ	RS-3/16	AK-8	Not Req.	Attach to R4A
R5A	1.5Meg	½	B40X334-E	Q11-138	A47-1.5Meg-S	AB-75	U-155	Vert. Hold
B	Shaft		Not Req.	NQ	RS-3/16	AK-4	Not Req.	Attach to R5A
R6A	2.5Meg	½	B40X369-A	Q11-239	A47-2.5Meg-S	AB-83	SU-565	AGC
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	2.5Meg	½	B40X369-A	Q11-239	A47-2.5Meg-S	AB-83	SU-565	Height
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8A	8000Ω	½	B40X375	Q11-116	A47-10K-S	AB-14	SU-20	Vert. Linearity
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R8A
R9A	7.5Meg	½	B40X370-A	Q11-142	A47-7.5Meg-S	AB-89	U-82	Sync Stability
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-4	Not Req.	Attach to R9A

* CONCENTRIKIT EQUIVALENT: KIT K-4, BASE ELEMENTS & SHAFTS: B11-108 & P6-218 (PANEL)
B13-137X & R16-313 (REAR)
76-2 SWITCH

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	NOTES
R10	22KΩ	½	12T-AE223K	BTS-22K	
R11	47KΩ	½	12T-AE473M	BTS-47K	
R12	820KΩ	½	12T-AE824T	BTS-820K	
R13	470KΩ	½	12T-AE474K	BTS-470K	
R14	1500Ω	1	12S-AE152K	BTA-1500	
R15	6800Ω	½	12T-AE682K	BTS-6800	
R16	100KΩ	½	12T-AE104K	BTS-100K	
R17	100KΩ	½	12T-AE104K	BTS-100K	
R18	100KΩ	½	12T-AE104K	BTS-100K	
R19	8200Ω 5%	½	12T-AE822K	BTS-8200 5%	
R20	10KΩ	½	12T-AE103M	BTS-10K	
R21	3300Ω	½		BTS-3300	
R22	3300Ω 5%	½		BTS-3300 5%	
R23	1000Ω	½		BTS-1000	
R24	47Ω 5%	½		BTS-47 5%	
R25	470Ω	½		BTS-470	
R26	150Ω	½		BTS-150	
R27	39KΩ 5%	½		BTS-39K 5%	
R28	47Ω 5%	½		BTS-47 5%	
R29	470Ω	½		BTS-470	
R30	150Ω	½		BTS-150	
R31	39KΩ 5%	½		BTS-39K 5%	
R32	180Ω	½		BTS-180	
R33	1500Ω	½		BTS-1500	
R34	3900Ω	½		BTS-3900	
R35	5600Ω	1		BTA-5600	
R36	1500Ω	½		BTS-1500	
R37	1Meg	½		BTS-1Meg	
R38	68Ω	½		BTS-68	
R39	2000Ω 5%	2	D83202	BTB-2000 5%	
R40	2000Ω 5%	2	D83202	BTB-2000 5%	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	NOTES
R41	100KΩ	½		BTS-100K	
R42	1Meg	½		BTS-1Meg	
R43	47KΩ	½		BTS-47K	
R44	100KΩ	½		BTS-100K	
R45	22KΩ	½		BTS-22K	
R46	33KΩ	½		BTS-33K	
R47	47KΩ	½		BTS-47K	
R48	330KΩ 5%	½		BTS-330K 5%	
R49	100KΩ	½		BTS-100K	
R50	470KΩ	½		BTS-470K	
R51	2.7Meg	½		BTS-2.7Meg	
R52	100Ω	½		BTS-100	
R53	1000Ω	½		BTS-1000	
R54	56KΩ	½		BTS-56K	
R55	33KΩ	½		BTS-33K	
R56	33KΩ	½		BTS-33K	
R57	1000Ω	½		BTS-1000	
R58	270Ω	½		BTS-270	
R59	68KΩ	½		BTS-68K	
R60	10KΩ 5%	½		BTS-10K 5%	
R61	10KΩ 5%	½		BTS-10K 5%	
R62	68KΩ	½		BTS-68K	
R63	10Meg	½		BTS-10Meg	
R64A	500KΩ	½	†76X5	BTS-470K	
B	500KΩ	½		BTS-470K	
R65	330Ω	1		BTA-330	
R66	1000Ω	2		BTB-1000	
R67	47KΩ	½		BTS-47K	
R68	10KΩ	½		BTS-10K	
R69	270KΩ	½		BTS-270K	
R70	1.5Meg	½		BTS-1.5Meg	

RESISTO

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	NOTES
R71	68KΩ	½		BTS-68K	
R72	820KΩ	½		BTS-820K	
R73	3300Ω 5%	½		BTS-3300 5%	
R74	3300Ω 5%	½		BTS-3300 5%	
R75A	22KΩ	½		BTS-22K	
B	8200Ω	½	♦76X7	BTS-8200	
C	8200Ω	½		BTS-8200	
R76	22KΩ	½		BTS-22K	
R77	3.3Meg	½		BTS-3.3Meg	
R78	22KΩ	½		BTS-22K	
R79	1.8Meg	½		BTS-1.8Meg	
R80	2.2Meg	½		BTS-2.2Meg	
R81	200KΩ 5%	½		BTS-200K 5%	
R82	8200Ω	½		BTS-8200	
R83	2.2Meg	½		BTS-2.2Meg	
R84	820Ω	½		BTS-820	
R85	2200Ω	½		BTS-2200	
R86	560Ω	½		BTS-560	
R87	100KΩ	½		BTS-100K	
R88	4.7Meg	½		BTS-4.7Meg	
R89	100KΩ	½		BTS-100K	
R90	27KΩ	½		BTS-27K	
R91	6800Ω	1		BTA-6800	

† Items R64A, R64B, C57A, C57B and
♦ Items R75A, R75B, R75C, C62A, C6

TRANSFORME

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	AIR LINE PART No.	Halldorson PART No.
T1	117VAC @ 1.64A	590VCT .270ADC	5VAC @ 3A	53X339B	
	SEC. 3	SEC. 4	SEC. 5		
	6.3VAC @ 9.1A				

① Parallel and phase 6.3V @ 5.8A winding for Sec.
② Tape other two 6.3V windings.

TRANSFORMERS (SV

ITEM No.	USE	AIR LINE PART No.	Halldorson PART No.	Merit PART No.
T2	Vert. Osc. Trans.	54X10	B6702	A-3003
T3	Horiz. Output Trans.	53X346	FB411 & RF800*①	HVO-9 & MWC-1* ①
T4	Vert. Output Trans.	51X168	Z1806 ①	A-3039 ①
T5A	Yoke-Horiz. (13.5MH)	9A2334-1 ②	DF602 ③	MDF-72 ③
B	Vert. (46MH)			
T6	Horiz. Lin. Coil (1.2-6.5MH)	9A2262	RF800 ④⑤	MWC-6 ⑥
T7	Width Coil (.1-.6MH)	9A2183		

① Drill new mounting hole(s).
② Includes resistor R86.
③ Use original yoke damping network.
④ Enlarge mounting hole.
⑤ Connect to terminals #3 and #4.
⑥ Connect to coded blue and green terminals.
⑦ Use original slider, clip and core.

*HORIZONTAL OUTPUT TRA

Use Original Width Coil Unl

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacer Connect
	6	9	9	10
	5	8	8	8
	4	5	5	7
	3	See Note ⑧	See Note ⑧	See ⑧
	2	T	T	NC
	1	1	1	3
	A	Term. #3 of RF800	Orange Term of MWC-1	2
	G	Term. #4 of RF800	Black Term. of MWC-1	1
Connect Width Coil Across →	2 & 1	Term. #1 & #2 of RF800 Across "T" & 1	Red & Blue terms of MWC-1 across "T" &1	212R acro 2 &
Special Notes →		⑧⑨	⑧⑨	⑧

⑧ Connect a 47MMF or 56MMF capacitor from open end of
⑨ If the picture is out of phase, reverse width coil primary
⑩ Jumper terms. #9 and "T".

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA AIR LINE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C58	.0047	400		D6-472	GP3-333-472	PT6347	IMPE-D47	3306347	
C58	5000			DD-502	811-001	DC-538	IMPE-D	C-1250	
C57A	10000								
B	250		*76X6	*PC-90	*1406-01				
C									
C58	.0047	600		D6-472	GP3-333-472	PT6347	IMPE-D47	3306347	
C59	.01	400		D6-109	GP3-333-103	PT6310	IMPE-D1	330411	
C60	1000			DD-102	801-001	DC-521		K-1210	
C61	.047	400		DF-503		PT6347	IMPE-S47	3306347	
C62A	2000					DC-532	IMPE-D8	C-1280	
B	5000		*76X7	*PC-100	1406-01	DC-535	IMPE-D5	C-1250	
C	5000					DC-535	IMPE-D5	C-1250	
C63	4700	500	47X543			MC3645		CR-1247	
C64	.022	200		DF-203	817-02	PT4122	IMPE-S22	3304122	
C65	.047	600		DF-503		PT6347	IMPE-S47	3306347	
C66	.022	200		DF-203	817-02	PT4122	IMPE-S22	3304122	
C67	.1	600		DF-104		PT601	IMPE-P1	330601	
C68	.047	600		DF-503		PT6347	IMPE-S47	3306347	
C69	.015	650	RCP10M6153M	DD15-153		PT615	IMPE-S15	3306115	
C70	1000			DD-102	801-001	DC-521	IMPE-D1	K-1210	
C71	1000			DD-102	801-001	DC-521	IMPE-D1	K-1210	
C72	.01	400		D6-103	GP3-333-103	PT611	IMPE-S1	33041	
C73	270	500		DF-271	811-271	MC2641		K-1237	
C74	.0047	400		D6-472	GP3-333-472	PT6347	IMPE-D47	3306347	
C75	.047	200		DF-503		PT4147	IMPE-S47	3303147	
C76	4700	500	47X543			MC3645		CR-1247	
C77	390	500	RCM30B391J	D5-391	811-391	MCB343		KR-1339	
C78	.1	400		DF-104		PT401	IMPE-P1	330401	
C79	330	500	47X570	D5-331	811-331			KR-1333	
C80	.047	400		DF-503		PT6347	IMPE-S47	3306147	
C81	.1	400		DF-104		PT401	IMPE-P1	330401	
C82	.047	400		DF-503		PT6147	IMPE-S47	3306147	
C83	600	20000	47XE60	TV3-603	418	RV20035A			
C84	.15	400	RCP10M6154M			PT601	IMPE-P15	3304015	
C85	10000	1000		DD-103					
C86	10000	1000		DD-103					

† Items C57A, C57B, C57C, R64A, R64B are combined in one unit.
When replacing items separately C57B and C57C should total 2504MMF.
* Items C62A, C62B, C62C, R57A, R71B and R71C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω		B6X21	*QJ-636	RTV-503	F1-4	UF15L	Contrast - Panel
B	1Meg				R2-59	UR16-T254	UR16-T254	Volume tapped at 250KΩ - Rear
C	Switch					KB-3	UB-37	Attach to R1B
R2A	500Ω	½	B40X361-C	Q1J-123	A47-50K-S	B1-31	U-35	Horiz. Hold
B	Shaft		Not Req.	NQ	R8-3/16	AK-4	Not Req.	Attach to R2A
R3A	1.5Meg	½	B40X334-E	Q1J-138	A47-1.5Meg-S	AB-75	U-155	Tone
B	Shaft		Not Req.	NQ	R8-3/16	AK-4	Not Req.	Attach to R3A
R4A	500KΩ	½	B40X333-A	Q1J-133	A47-500E-S	AB-59	U-50	Brightness
B	Shaft		Not Req.	NQ	R8-3/16	AK-4	Not Req.	Attach to R4A
R5A	1.5Meg	½	B40X354-E	Q1J-138	A47-1.5Meg-S	AB-75	U-155	Vert. Hold
B	Shaft		Not Req.	NQ	R8-3/16	AK-4	Not Req.	Attach to R5A
R6A	2.5Meg	½	B40X369-A	Q1J-139	A47-2.5Meg-S	AB-83	U-165	AGC
B	Shaft		Not Req.	NQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	2.5Meg	½	B40X369-A	Q1J-239	A47-2.5Meg-S	AB-83	SU-565	Height
B	Shaft		Not Req.	NQ	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8A	6000Ω	½	B40X375	Q1J-116	A47-10K-S	AB-14	SU-30	Vert. Linearity
B	Shaft		Not Req.	NQ	FKS-1/4	AK-1	Not Req.	Attach to R8A
R9A	7.5Meg	½	B40X370-A	Q1J-142	A47-7.5Meg-S	AB-89	U-82	Sync Stability
B	Shaft		Not Req.	NQ	FKS-1/4	AK-4	Not Req.	Attach to R9A

* CONCENTRIKIT EQUIVALENT: KIT K-4, BASE ELEMENTS & SHAFTS: B1I-109 & P6-318 (PANEL)
B13-127X & R16-313 (REAR)
76-2 SWITCH

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	NOTES
R10	22KΩ	½	12T-AE223K	BTS-22K	
R11	47KΩ	½	12T-AE473M	BTS-47K	
R12	820KΩ	½	12T-AE824T	BTS-820K	
R13	470KΩ	½	12T-AE474K	BTS-470K	
R14	1500Ω	½	12S-AE152K	BTS-1500	
R15	6800Ω	½	12T-AE682K	BTS-6800	
R16	100KΩ	½	12T-AE104K	BTS-100K	
R17	100KΩ	½	12T-AE104K	BTS-100K	
R18	100KΩ	½	12T-AE104K	BTS-100K	
R19	8200Ω 5%	½	12T-AE822K	BTS-8200 5%	
R20	10KΩ	½	12T-AE103M	BTS-10K	
R21	3300Ω	½		BTS-3300	
R22	3300Ω 5%	½		BTS-3300 5%	
R23	1000Ω	½		BTS-1000	
R24	4.7Ω 5%	½		BTS-47 5%	
R25	470Ω	½		BTS-470	
R26	150Ω	½		BTS-150	
R27	39KΩ 5%	½		BTS-39K 5%	
R28	4.7Ω 5%	½		BTS-47 5%	
R29	470Ω	½		BTS-470	
R30	150Ω	½		BTS-150	
R31	39KΩ 5%	½		BTS-39K 5%	
R32	180Ω	½		BTS-180	
R33	1500Ω	½		BTS-1500	
R34	3900Ω	½		BTS-3900	
R35	5600Ω	1		BTA-5600	
R36	1500Ω	½		BTS-1500	
R37	1Meg	½		BTS-1Meg	
R38	68Ω	½		BTS-68	
R39	3000Ω 5%	3	D63203	BTS-3000 5%	
R40	3000Ω 5%	2	D63203	BTS-3000 5%	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	NOTES
R41	100KΩ	½		BTS-100K	
R42	1Meg	½		BTS-1Meg	
R43	47KΩ	½		BTS-47K	
R44	100KΩ	½		BTS-100K	
R45	22KΩ	½		BTS-22K	
R46	33KΩ	½		BTS-33K	
R47	47KΩ	½		BTS-47K	
R48	330KΩ 5%	½		BTS-330K 5%	
R49	100KΩ	½		BTS-100K	
R50	470KΩ	½		BTS-470K	
R51	2.7Meg	½		BTS-2.7Meg	
R52	1000Ω	½		BTS-1000	
R53	1000Ω	½		BTS-1000	
R54	56KΩ	½		BTS-56K	
R55	33KΩ	½		BTS-33K	
R56	33KΩ	½		BTS-33K	
R57	1000Ω	½		BTS-1000	
R58	270Ω	½		BTS-270	
R59	68KΩ	½		BTS-68K	
R60	10KΩ 5%	½		BTS-10K 5%	
R61	10KΩ 5%	½		BTS-10K 5%	
R62	68KΩ	½		BTS-68K	
R63	10Meg	½		BTS-10Meg	
R64A	500KΩ	½		BTS-470K	† 76X5
B	500KΩ	½		BTS-470K	
R65	330Ω	1		BTA-330	
R66	1000Ω	2		BTS-1000	
R67	47KΩ	½		BTS-47K	
R68	10KΩ	½		BTS-10K	
R69	470KΩ	½		BTS-470K	
R70	1.5Meg	½		BTS-1.5Meg	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	NOTES
R71	68KΩ	½		BTS-68K	
R72	820KΩ	½		BTS-820K	
R73	3300Ω 5%	½		BTS-3300 5%	
R74	3300Ω 5%	½		BTS-3300 5%	
R75A	22KΩ	½		BTS-22K	
B	8200Ω	½	*76X7	BTS-8200	
C	8200Ω	½		BTS-8200	
R76	33KΩ	½		BTS-33K	
R77	3.3Meg	½		BTS-3.3Meg	
R78	22KΩ	½		BTS-22K	
R79	1.5Meg	½		BTS-1.5Meg	
R80	2.2Meg	½		BTS-2.2Meg	
R81	200KΩ 5%	1		BTS 200K 5%	
R82	8200Ω	½		BTS 8200	
R83	2.2Meg	½		BTS-2.2Meg	
R84	820Ω	½		BTS-820	
R85	2200Ω	½		BTS-2200	
R86	560Ω	½		BTS-560	
R87	100KΩ	½		BTS-100K	
R88	4.7Meg	½		BTS-4.7Meg	
R89	100KΩ	½		BTS-100K	
R90	27KΩ	½		BTS-27K	
R91	6800Ω	1		BTA-6800	

† Items R64A, R64B, C57A, C57B and C57C are combined in one unit.
• Items R75A, R75B, R75C, C62A, C62B and C62C are combined in one unit.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIR LINE PART No.	IRC PART No.	NOTES
R92	6800Ω	1		BTA-6800	
R93	470KΩ	½		BTS-470K	
R94	1500Ω 5%	½		BTS-1500 5%	
R95	4700Ω 5%	½		BTS-4700 5%	
R96	150KΩ	½		BTS-150K	
R97	180KΩ	½		BTS-180K	
R98	47KΩ	½		BTS-47K	
R99	8200Ω	½		BTS-8200	
R100	470KΩ	½		BTS-470K	
R101	68Ω	½		BTS-68Ω	
R102	100Ω	2			
R103	33KΩ	2		BTB-33K	
R104	27KΩ	2		BTB-27K	
R105	47KΩ	1		BTA-47K	
R106	6800Ω	2		BTB-6800	
R107	5600Ω	1		BTS-5600	
R108	3.3Ω	1	43X338		
R109	1Meg	1		BTA-1Meg	
R110	33KΩ	10	43X273		
R111	1700Ω	10	43X285		
R112	100KΩ	2		BTB-100K	
R113	270KΩ	1		BTS-270K	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA AIR LINE PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ⑪1.84A	580VCT .370ADC	5VAC ⑩ 3A	53X339B		P-2838 ① ⑪				
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC ⑨8.1A									

① Parallel and phase 6.3V ⑨ 5 8A winding for Sec. #1.
② Tape other two 6.3V windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	AIR LINE PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	54X10	B6702	A-3003	209T1 ①	V405	A-8125	26A03	A-97X
T3	Horiz. Output Trans.	53X346	FB41i & RF800•①	BVO-9 ④ 232T1 & MWC-1• ①	232T1 *	XU10 *	A-8252 & A-8255 ①	FLY-37 *	D-35 & WC-18 * ①
T4	Vert. Output Trans.	51X188	21R06 ⑦	A-3039K ①	226T1 ①	V312 ①	A-8141 ①	26S54 ①	A-104XL
T5A	Yoke-Horiz. (25.5MH)	8A2334-1 ④	DP802 ④	MDF-72 ①	211D2 ①	T70F24 ②	DY-8A ③	Y-4 ④	Y-37 ④
B	Vert. (46MH)				④				
T6	Horiz. Lin. Coil (1.6-8.5MH)	8A2282	RF800 ⑤⑥	MWC-6 ⑤	211R1 ① 20HR4 ⑦	20HR15 ① 20HR4 ⑦	WC-8 ① WC-4 ⑦	WC-32 ① WC-15 ⑦	WC-18 ⑧
T7	Width Coil (.1-.6MH)	8A3183							

① Drill new mounting hole(s).
② Includes resistor R86.
③ Use original yoke damping network.
④ Enlarge mounting hole.
⑤ Connect to terminals #3 and #4.
⑥ Connect to coded blue and green terminals.
⑦ Use original slider, clip and core.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5	5	5	5	5	5	5
6	9	9	10	13	9	13	10
5	8	8	8	Jumper 8 & 11	Jumper 8 & 11	Jumper 10 & 11	8
4	5	5	7	6	5	6	7
3	See Note ⑪	See Note ⑪	See Note ⑪	5 or 4	See Note ⑪	5 or 4	See Note ⑪
2	T	T	NC	2	3	2	NC
1	1	1	3	1	1	1	3
A	Term. #3 of RF800	Orange Term. of MWC-1	2	9	Red Term. of WC-5	9	2
G	Term. #4 of RF800	Black Term. of MWC-1	8	8	Blue Term of WC-5	8	1
Connect Width Coil Across →	Term #1 & #2 of RF800 Across "T" & 1	Red & Blue terms of MWC-1 across "T" & 1	212R1 across 2 & 1	2 & 1	Orange & black term. of WC-5 across 3 & 1	2 & 1	Red & blue terms of WC-12 across 2 & 1
Special Notes →	⑫⑬	⑫⑬	⑬		⑫⑬		⑬ ⑩

① Connect a 47MMF or 56MMF capacitor from open end of R107 (orig. term. #3 connection) to term. #3 of yoke(red lead).
② If the picture is out of phase, reverse width coil primary or secondary.
③ Jumper terms. #9 and "T".

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA AIR LINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T8	5.2KΩ	3.7Ω	51X186		Z1107	A-2930	A-3877	24851	S-3X

SPEAKER

ITEM No	RATINGS SIZE	RATINGS FIELD	REPLACEMENT DATA AIR LINE PART No	OUAM PART No	NOTES
SP1	8"	PM	3.7Ω 12A518	6A31	① Used in console models
	10"	PM	3.7Ω 12A519 ①	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES PRI.	DC RES SEC.	REPLACEMENT DATA AIR LINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1A	Ant. Coil	0Ω	0Ω	9A2232-2				Channel 2
B	Ant. Coil	0Ω	0Ω	9A2232-3				Channel 3
C	Ant. Coil	0Ω	0Ω	9A2232-4				Channel 4
D	Ant. Coil	0Ω	0Ω	9A2232-5				Channel 5
E	Ant. Coil	0Ω	0Ω	9A2232-6				Channel 6
F	Ant. Coil	0Ω	0Ω	9A2232-7				Channel 7
G	Ant. Coil	0Ω	0Ω	9A2232-8				Channel 8
H	Ant. Coil	0Ω	0Ω	9A2232-9				Channel 9
I	Ant. Coil	0Ω	0Ω	9A2232-10				Channel 10
J	Ant. Coil	0Ω	0Ω	9A2232-11				Channel 11
K	Ant. Coil	0Ω	0Ω	9A2232-12				Channel 12
L	Ant. Coil	0Ω	0Ω	9A2232-13				Channel 13
L2	Neut. Coil	0Ω		31B-727				
L2A	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-2				Channel 2
B	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-3				Channel 3
C	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-4				Channel 4
D	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-5				Channel 5
E	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-6				Channel 6
F	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-7				Channel 7
G	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-8				Channel 8
H	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-9				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-10				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-11				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-12				Channel 12
L	RF, Mixer Grid & Osc. Coils	0Ω		9A2330-13				Channel 13
L4	Conv. Plate	.1Ω		31K-109				
L5	IF Trap	.1Ω		9A2330	17-4523 *	TV-130 *	6218 *	
L6	1st. Video IF	0Ω		9A2316	17-5001	TV-132 *	6231	
L7	2nd. Video IF	.1Ω	.1Ω	9A2317	17-5003	TV-133	6238 ■	Includes 47.25MC trap
L8	Fil. Choke	0Ω		9A2032	19-1002		4606	2.2 Microhenries
L9	3rd. Video IF	.1Ω	.1Ω	9A2318	17-5001	TV-132 ▲	6233 ▲	
L10	Fil. Choke	0Ω		9A2033	19-1003		4606	2.2 Microhenries
L11	Parasitic Suppressor	0Ω		9A2322				1 turn wire-wound on 100Ω resistor
L12	Cathode Trap	0Ω		9A2331				
L13	4th. Video IF	4Ω	4Ω	9A2319	17-5004	TV-125	6234	
L14	Series Peaking Coil	7Ω		36A10	19-3075		6175	60 Microhenries
L15	Shunt Peaking Coil	17Ω		36A22	19-3300	TV-185	6155	290 Microhenries
L16	4.5MC Trap	.2Ω		9A2074	20-1004	TV-151	1469	
L17	Shunt Peaking Coil	10Ω		36A1	19-3100	TV-181	6177	100 Microhenries
L18	Shunt Peaking Coil	9.5Ω		36A25	19-3100 •	TV-181 •	6177 •	100 Microhenries, wound on 470Ω resistor
L19	Series Peaking Coil	12.5Ω		36A12	19-4150	TV-184 ▲	6180 ▲	160 Microhenries, wound on 22KΩ resistor
L20	Shunt Peaking Coil	14Ω		36A2	19-4201	TV-184	6154	190 Microhenries
L21	1st Sound IF	2Ω		9A2201	17-1021 ■	TV-113 *	6203 *	
L22	2nd Sound IF	2.4Ω	2Ω	9A2323	17-1021	TV-113	6203	
L23	Ratio Det	5.6Ω	50CT	9A2295	17-3497	TV-115	6205	Tertiary winding- 5Ω
L24	Horiz. Osc	85Ω		9A2096	19-1576	TV-163	6210	

* Use one winding only.
■ Drill mounting holes.
▲ Detune trap.
• Parallel with 470Ω resistor.
▲ Parallel with 33KΩ resistor.

AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG-5103B

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	AIR LINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L25	.270ADC	40.6Ω	.83 HY	52X95	C5037 ①	C-2996 ①	C-2326 ①	26C44	C-23X ①

① Drill one new mounting hole .

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			AIR LINE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	4/10A 125V		16X146	313.400 (3AG S/B-4/10A)	357001	MDL 4/10	4405

MISCELLANEOUS

ITEM No.	PART NAME	AIR LINE PART No.	NOTES
M2	Tuner	25A1125	VHF - Models WG-5002C and WG-5003C
M3	Tuner	25A1128	UHF-VHF - Models WG-5102B and WG-5103B
M4	Trap	31K-919	VHF antenna Input Filter - Models WG-5002C, WG-5003C
	Trap	31K-225-03	VHF Antenna Input Filter - Models WG-5102B, WG-5103B
M5	Focus Magnet	2A438-2	Includes centering device
M6	Ion Trap	2A421	
B2	Trimmer Cap.	17A269	Horiz. Drive (120-400MMF)
	Knob	10A820-1	Fine tuning - Mahogany Cabinet - Model WG-5002C
	Knob	10A840-1	Contrast - Mahogany Cabinet - Model WG-5002C
	Knob	10A812-1	Channel Selector - Mahogany Cabinet - Model WG-5002C
	Knob	10A841-1	On/off/volume - Mahogany Cabinet - Model WG-5002C
	Knob	10A820-2	Fine tuning -Oak Cabinet - Model WG-5003C
	Knob	10A840-2	Contrast - Oak Cabinet - Model WG-5003C
	Knob	10A812-3	Channel Selector - Oak Cabinet - Model WG-5003C
	Knob	10A841-2	On/off-volume - Oak Cabinet - Model WG-5003C
	Knob	10A826	Secondary Controls (Red) All Models
	Knob	10A846-1	Fine tuning - Mahogany Cabinet - Model WG-5102B
	Knob	10A853-1	UHF Channel Selector - Mahogany Cabinet - Model WG-5102B
	Knob	10A852-1	VHF Channel Selector - Mahogany Cabinet - Model WG-5102B
	Knob	10A847-1	Contrast - Mahogany Cabinet - Model WG-5102B
	Knob	10A830-1	On/off/volume - Mahogany Cabinet - Model WG-5102B
	Knob	10A846-2	Fine tuning - oak Cabinet - Model WG-5103B
	Knob	10A853-2	UHF Channel Selector - Oak Cabinet - Model WG-5103B
	Knob	10A852-2	VHF Channel Selector - Oak Cabinet - Model WG-5103B
	Knob	10A847-2	Contrast - Oak Cabinet - Model WG-5103B
	Knob	10A830-3	On/off/volume - Oak Cabinet - Model WG-5103B
	Safety Glass	17X187	
	Mask	4X1241-2	

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution-V18, V19, V20 and V21. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, T7, C82, C81, C84, C80, R103, R104, and other associated components.	Check L24, C76, C77, R95, R98, R94, R96 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V19, V20 and V22. Check T3, T5A, R103, R104, and other associated components.

BLOOMING

Check by substitution V19, V20, V21 and V22. Check R109, R103, R104, R102, C7 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss Of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak Or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7 and V8. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

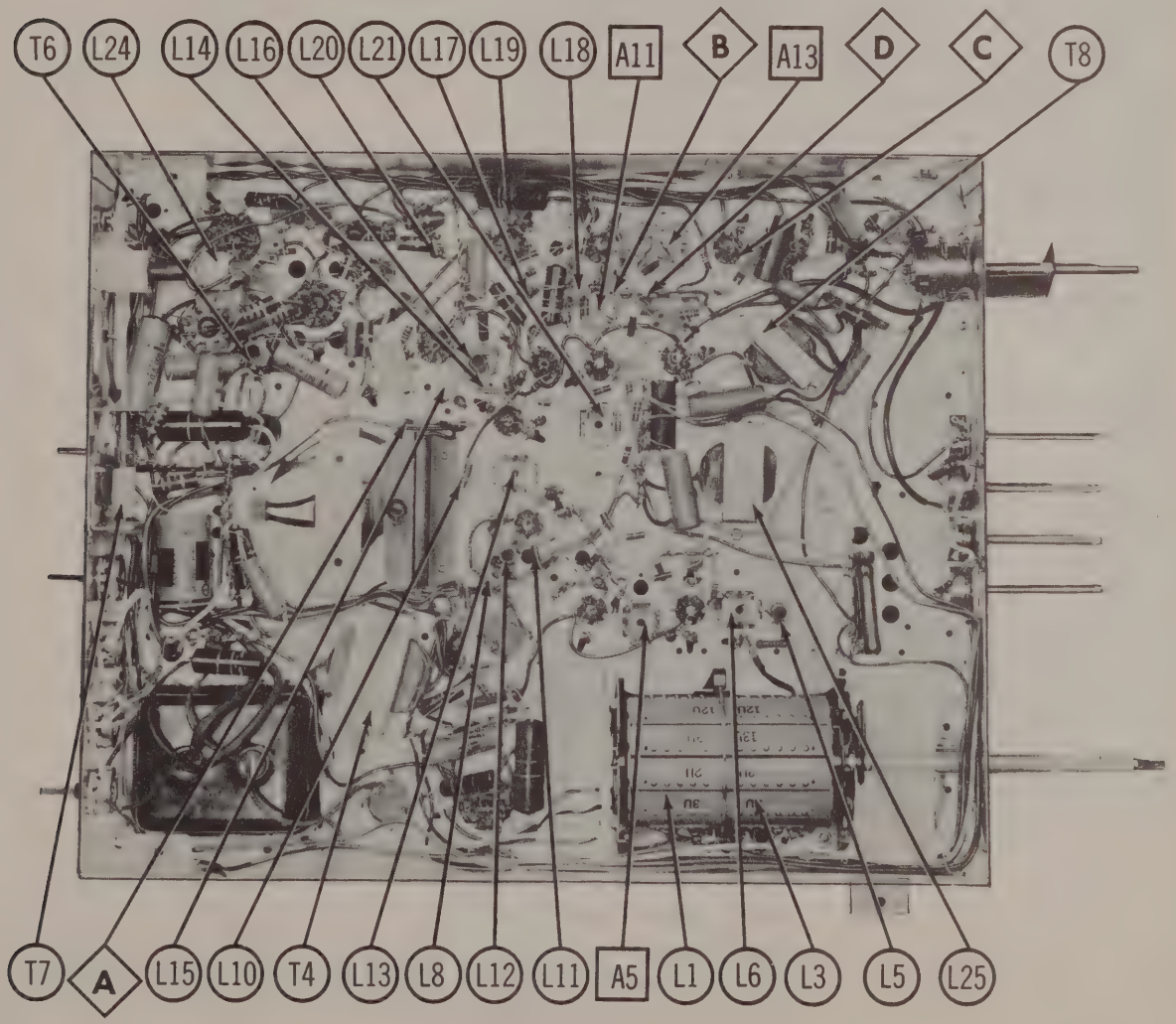
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



AIRLINE MODELS WG-5002C, WG-5003C, WG-5102B, WG5103B

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner oscillator Circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible , one at a time, through the small hole in the cabinet above and slightly to the left of the channel selector shaft.

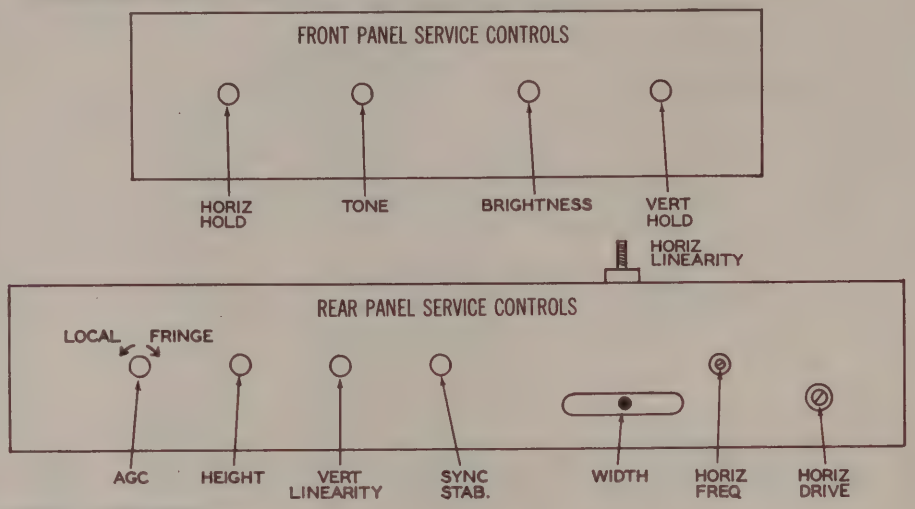
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 5 wood screws holding plastic strip at the top of the safety glass. Remove plastic strip and safety glass. The extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS:

AGC CONTROL ADJUSTMENT

Turn set on and tune in strongest station in that area. Turn the AGC control(R6) clockwise until the picture shows signs of overloading, faded out picture and buzz in sound. Turn R6 back counter clock wise from the point where overloading occurs until no sign of overloading is noted.

SYNC STABILITY CONTROL ADJUSTMENTS

Turn set on and tune in strongest TV station in that area. Rotate the sync stability control (R9) clockwise until bending is noted near the top of picture. Turn R9 counter clock wise until picture bending disappears and sync is stable.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontol hold control at its mid-range position and adjust the horzontol frequency slug (L24) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz adjust the ratio detector secondary (L23) located on top of chassis.

FUSES

One fuse is used for L.V. power supply protestion. (For location see tube placement chart.)

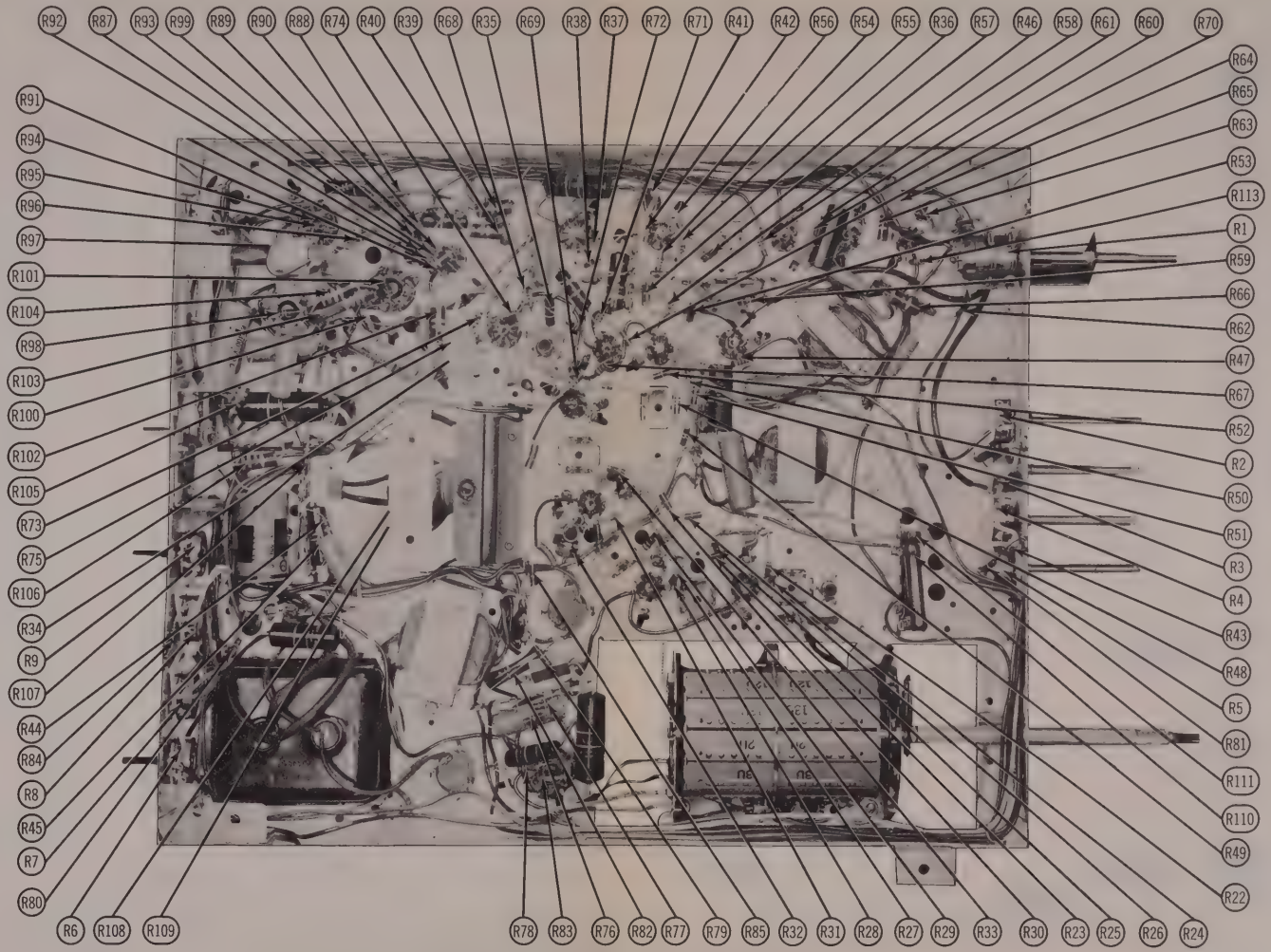
CENTERING

Centering is accomplished mechanically by means of a centering lever on the P.M Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 4 wood screws. Remove rear cover.
3. Remove 2 wood screws holding antenna bracket.
4. Disconnect speaker leads.
5. Remove 4 speaker nuts. Remove speaker.
6. Remove 5 chassis bolts. Remove chassis.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PHOTOFACT* Folder

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MODEL 21T321W

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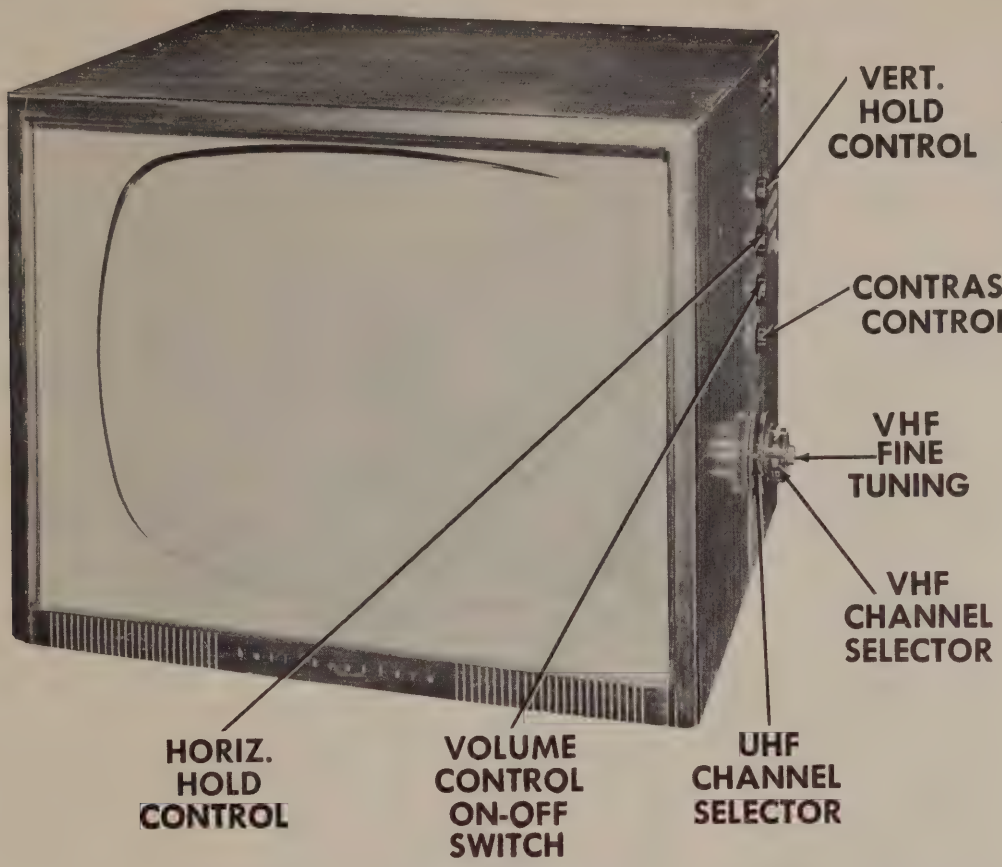

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HALLICRAFTERS MODEL 21T321W (Run 2)

TRADE NAME	Hallicrafters Models 21K331B, 21K331M, 21K341B, 21K341M, 21T321B, 21T321M, 21T321W (Ch. A1700D, Runs 1, 2, 2A, 3, 3A)
MANUFACTURER	Hallicrafters Co., 4401 W. 5th. Ave., Chicago 24, Illinois
TYPE SET	Television Receiver
TUBES	Sixteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.2 Amp. @ 117 Volts AC
TUNING RANGE-	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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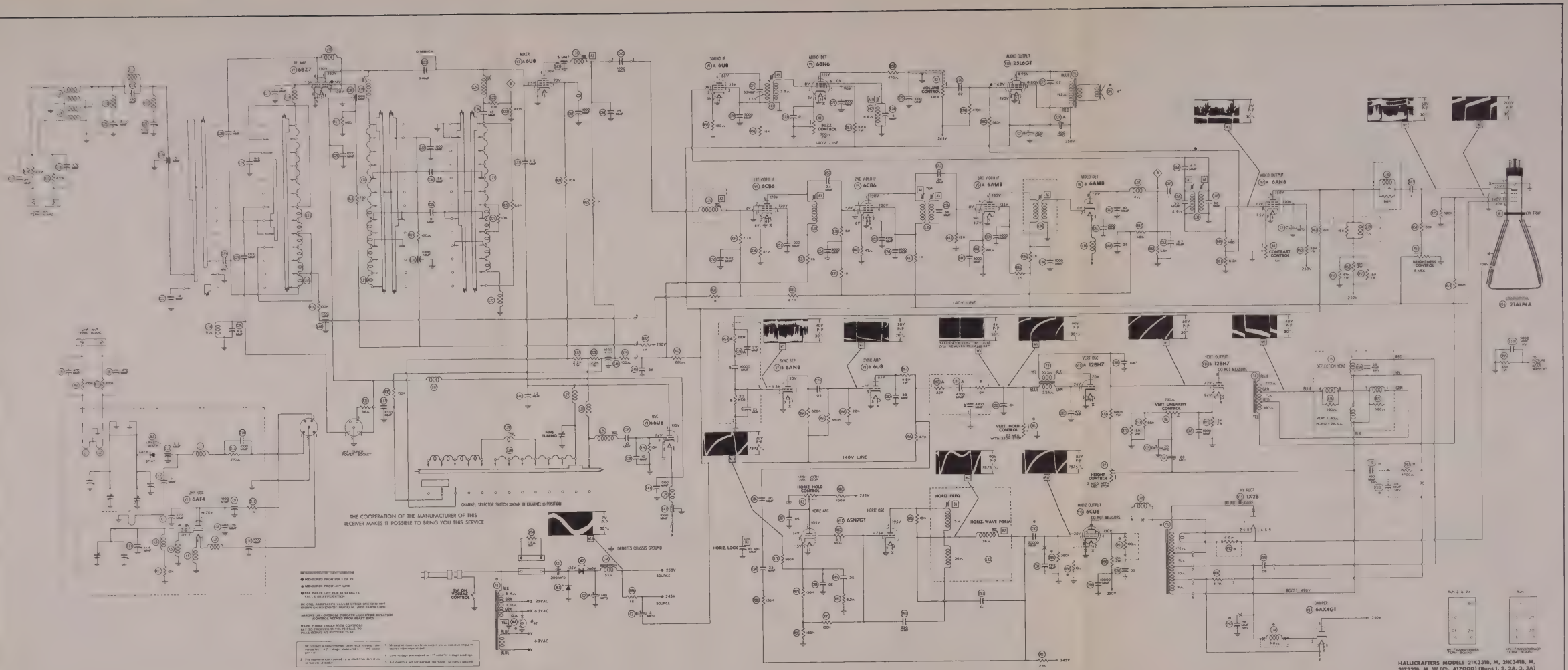
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CHASSIS TOP VIEW

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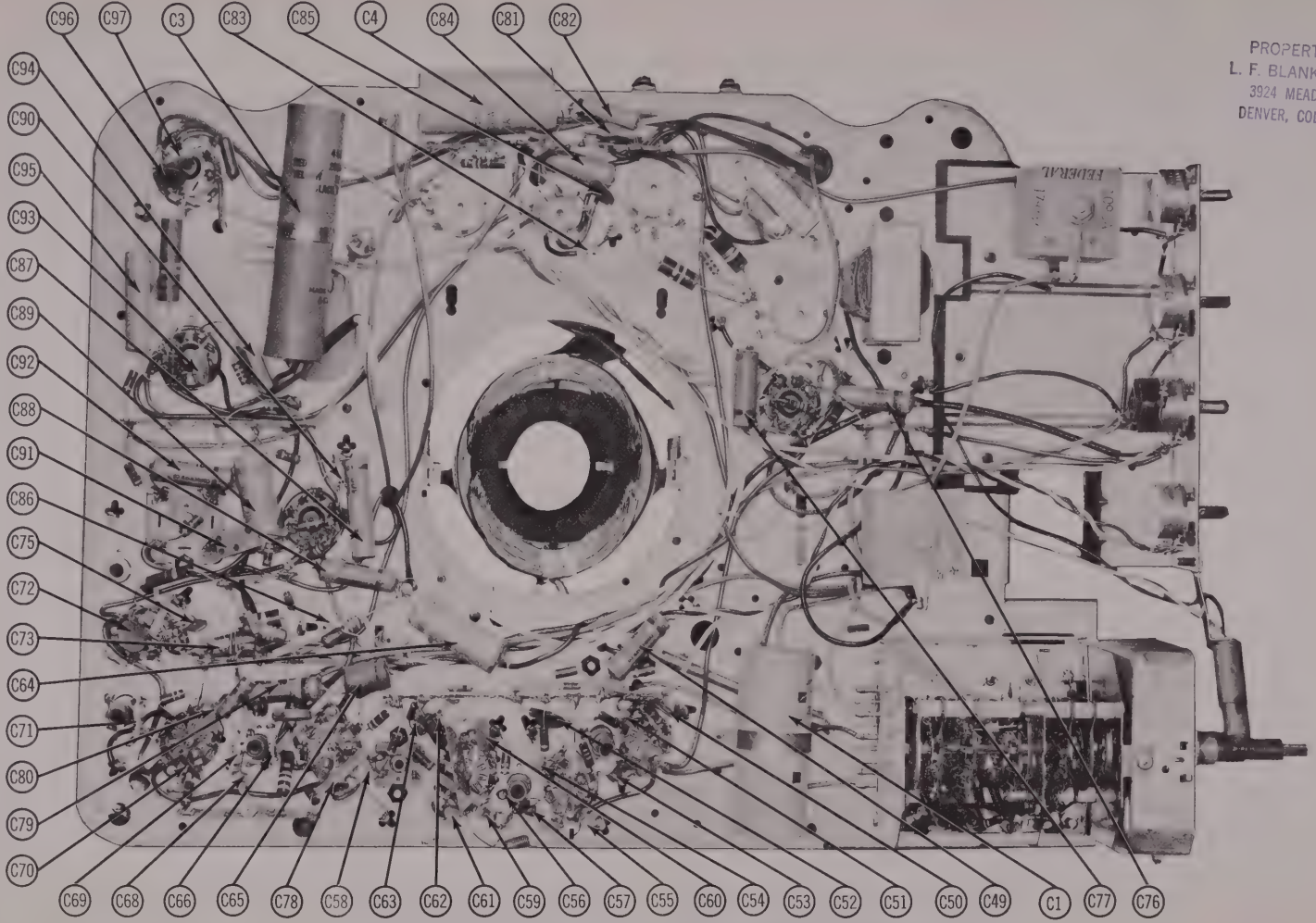

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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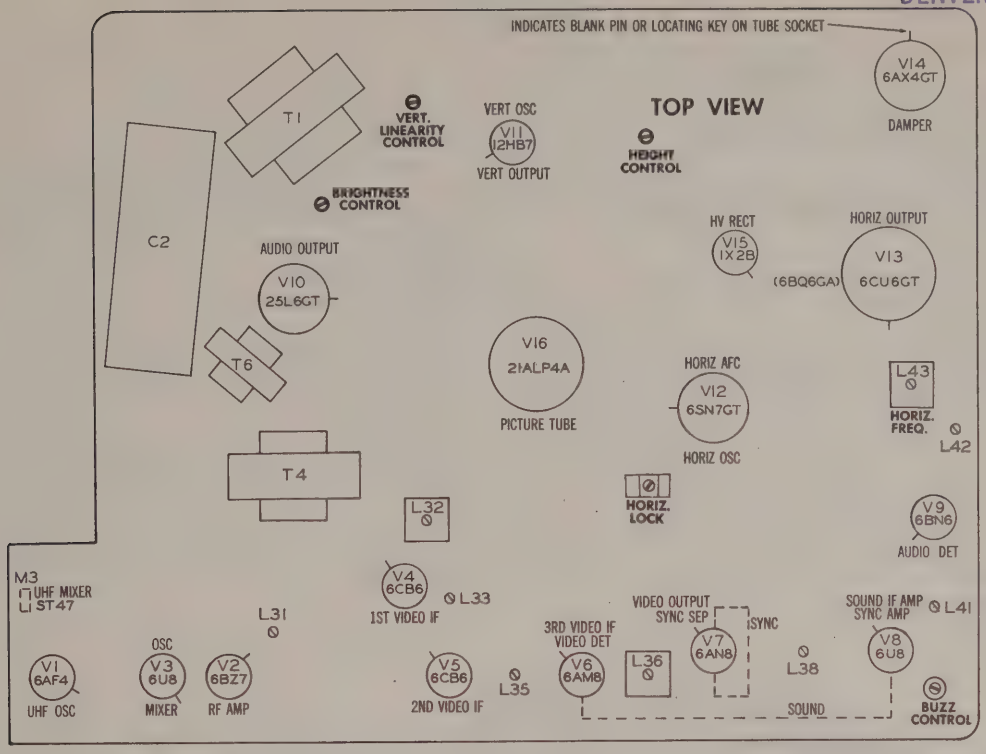
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V10 (V1 UHF only)**
No pic, no sound, has snow - **V2, V3, V4**
No pic, has sound, has raster - **V7, V16**
Has pic, no sound - **V8, V9, V10**

SYNC FAILURE
No vert. sync - **V8, V11**
No horiz. sync - **V8, V12**
No vert. or horiz. sync - **V7, V8**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V11**
Poor vert. linearity or foldover - **V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, M1, M2**
Vert. off freq. - **V8, V11**
Horiz. off freq. - **V8, V12**

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V13 and V14. Check M1 and M2. Check R90, R94, C93, C94, T3, T5A and other associated components.

DRIVE LINES

Check by substitution V13 and V14. Check C93, C94, T3, T5A, R90 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V13 and V14. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines."

PIE CRUST EFFECT

Check by substitution V12, V13 and V14. Check C88 and C89 for open. Check L43, R81, R79 and other associated components.

XMAS TREE EFFECT

Check by substitution V12, V13 and V14. Check T3 and T5 for internal arcing. Check L43, C90, R88, R80, R86 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V11. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R72, R73, C4 and other associated components.	Check T2, C82, C83, R7 and other associated components.

INSUFFICIENT SWEEP

Substitute V11. Check height and vertical linearity controls for proper operation.

COMPRESSED AT BOTTOM

Substitute V11. Check T2, R7, R70 and other associated components.

COMPRESSED AT TOP

Substitute V11. Check R6, R72, R73, R71, C2D and other associated components.

FOLDS

Substitute V11. Check T2, T4, T5B, C84 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V7 and V8. Check C78, C79, C80, R64, R65, R67, R68 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V11. Check vertical integrator network. Check R1, T2, C82 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V12. Check C86, R83, R2, L43 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V8 and V12. Check components associated with V12.

VIDEO

LOSS OF VIDEO

Substitute V7. Check C65, C67, C2C, R50, R52, R53 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A7. Check video IF Alignment.

POOR CONTRAST

Substitute V7. Check contrast control. Check C65, C67, L40 and other associated components.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check L37, L40, C65, C67 and other associated components.

SMEAR

Substitute V7. Check L37, L39, L40, C65, C67 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V2, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9 and V10. Check stage V10 using audio signal generator. Apply audio signal across C75.

If Satisfactory	If Unsatisfactory
Check audio detector and audio IF stages for component failure or change of value.	Check C75, C76, C77, R58, R60, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A10 and R8 for mimimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound."

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check M1, M2, C1 and R94. Check B+ filter and decoupling network.

SMALL AND/ON DIM PICTURE

Check M1, M2, C1 and R94. Check B+ filter and decoupling network.

TROUBLE SHOOTING AIDS (cont)

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HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V12, V13, V14 and V15. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C95, C96, C97, C98, R90 and other associated components.	Check L43, C87, C91, C92, C93, R2, R83, R87, R88, R86 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V13 and V14. Check M1 and M2. Check R94, R90, C93 and other associated components.

BLOOMING

Check by substitution V13, V14 and V15. Check M1 and M2. Check C93, R90 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V2, V3, V4, V5, V6, V7 and V10. Check video IF components for failure or change of value. Raster, No Sound, No Picture, UHF, substitute V1.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

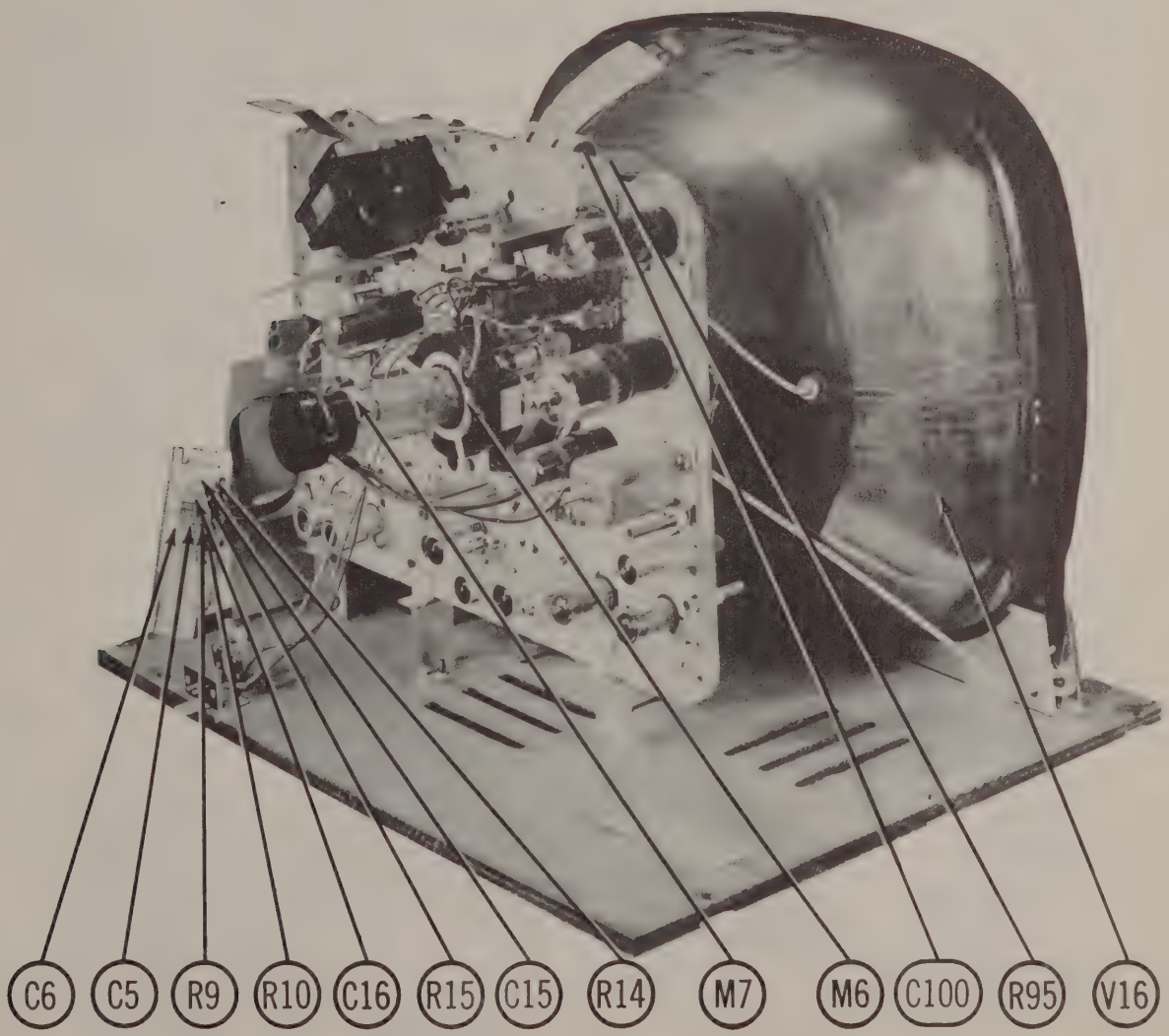
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

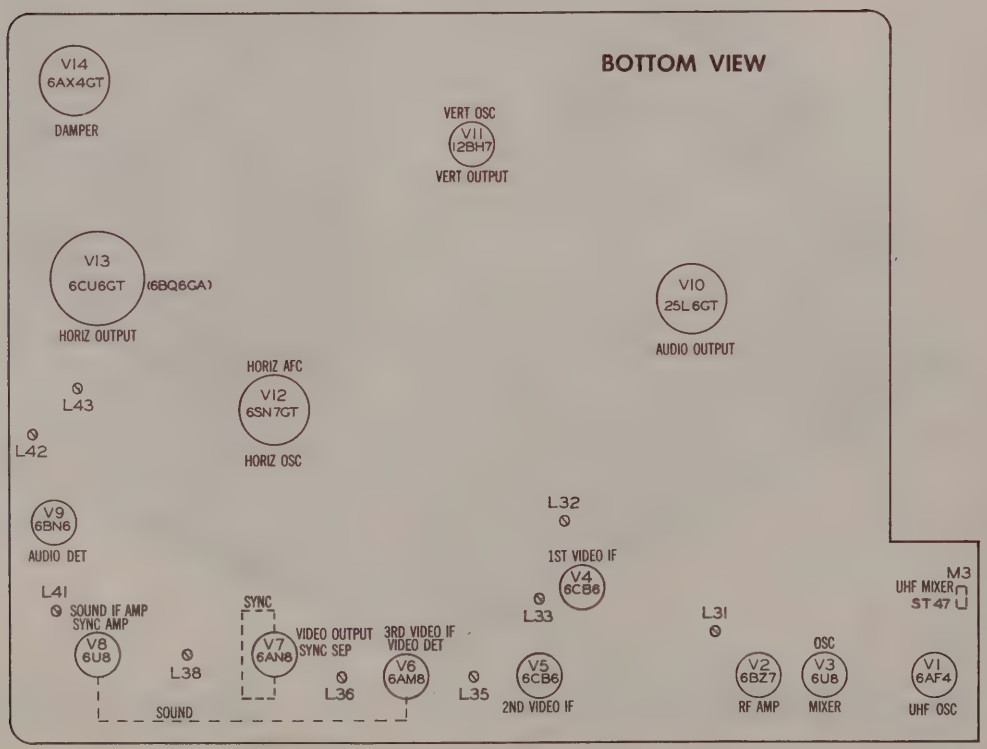


CHASSIS—REAR VIEW

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	*■5.7KΩ	10KΩ	.1Ω	0Ω	0Ω	10KΩ	*■5.7KΩ		
V 2	6BZ7	†1.5KΩ	450KΩ	INF	.1Ω	0Ω	INF	1Meg	0Ω	0Ω
V 3	6U8	■2.5KΩ	480KΩ	■15KΩ	.1Ω	0Ω	■1.3KΩ	0Ω	0Ω	15KΩ
V 4	6CB6	1Meg	47Ω	.1Ω	0Ω	■1.2KΩ	■1.2KΩ	0Ω		
V 5	6CB6	1Meg	47Ω	.1Ω	0Ω	■1KΩ	■1KΩ	0Ω		
V 6	6AM8	180Ω	12KΩ	■1KΩ	.1Ω	0Ω	■1KΩ	.2Ω	5.6KΩ	0Ω
V 7	6AN8	■820KΩ	2.2Meg	0Ω	0Ω	.1Ω	†6KΩ	†39KΩ	1Meg	100Ω
V 8	6U8	■12KΩ	.8Ω	■18KΩ	0Ω	.1Ω	■18KΩ	150Ω	0Ω	22KΩ
V 9	6BN6	300Ω	3.5Ω	0Ω	.1Ω	■5.6KΩ	4.8Ω	†330KΩ		
V 10	25L6GT	TP	0Ω	†250Ω	†55Ω	250KΩ	TP	1.6Ω	60KΩ	
V 11	12BH7	▲3Meg	600KΩ	0Ω	.1Ω	.1Ω	▲1.3KΩ	▲3Meg	7.5KΩ	0Ω
V 12	6SN7GT	750KΩ	†80KΩ	300KΩ	250KΩ	†28KΩ	0Ω	0Ω	.1Ω	
V 13	6CU6	TP	.1Ω	TP	†12KΩ	390KΩ	NC	0Ω	0Ω	TOP CAP ▲22Ω
V 14	6AX4GT	NC	TP	200KΩ	NC	†55Ω	TP	200KΩ	200KΩ	
V 15	1X2B		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲192Ω
V 16	21ALP4A	0Ω	0Ω	PIN 6 60KΩ	PIN 10 ▲390KΩ	PIN 11 1Meg	PIN 12 .1Ω			

* MEASURED IN "UHF" POSITION
■ MEASURED FROM 140V LINE
† MEASURED FROM OUTPUT OF M2
▲ MEASURED FROM PIN 3 OF V14
TP- TIE POINT
NC - NO CONNECTION



TUBE PLACEMENT CHART

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage shock hazard may be eliminated by removing the 6AX4 (V14) damper tube and connecting a 2250Ω, 30 watt resistor from pin 5 of 6AX4 socket to chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C64. Connect the positive lead to chassis.
Two peaks may occur during alignment of the video IF coils. Use the peak with the slug entering the coil from the end nearest the chassis.
The sound trap (A5) should be tuned with the slug entering the coil from the end away from the chassis.
Attenuate generator output for 2 volts peak to peak.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to point (B). Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	Any unused high band channel	Vert. Amp. thru detector probe (Fig.1) to pin 5 (plate) of 6CB6 (V4). Low side to chassis.	A1, A2	Adjust for response similar to Fig. 2 with markers in proper position. Remove scope and detector from pin 5 of V4.
2.	"	"	"	41.25MC 42.5MC 45.75MC	"	Vert. Amp. thru 3.3KΩ to point (A). Low side to chassis.	A3, A4, A5, A6	Adjust for response similar to Fig. 3. Adjust A5 for MINIMUM amplitude at 41.25MC. A3 affects the high frequency end of the response curve and A4 affects the low frequency end. A6 affects center of response. Adjust A6 for maximum amplitude and MINIMUM tilt.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set volume control for normal volume.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	.001MFD	High side to pin 8 (plate) of 6AM8 (V6A). Low side to chassis.	4.5MC (400∿Mod) (50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of sound output transformer.	A10	Set buzz control (R8) 90 degrees from maximum clockwise rotation. Adjust A10 for maximum 400∿ indication on scope.
4.	"	"	"	"	"	"	A7, A8, A9	Attenuate generator output so that signal level is below the limiting level of the 6BN6 as evidenced by background hiss and noise. Adjust A7, A8 and A9 for maximum response on scope.
5.	"	"	Not used	4.5MC (400∿Mod)	"	"	R8	Use high signal generator output and adjust R8 for MINIMUM 400∿ indication on scope.
6.	"	"	4.5MC (400∿Mod.) (50KC Swp)	"	"	"	A10	With volume control at low level retouch A10 for maximum 400∿ indication on scope. Remove test equipment. Connect antenna and tune in weakest TV station in area and retouch R8 for MINIMUM buzz and hiss. Tune in strongest TV station in area and adjust A10 for clearest sound.

VHF TUNER ALIGNMENT

The VHF tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

UHF TUNER ALIGNMENT

The UHF tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

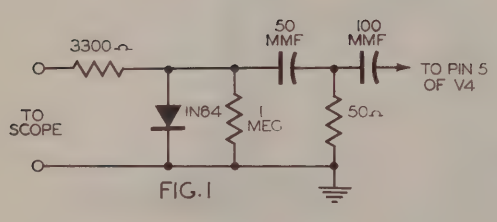


FIG.1

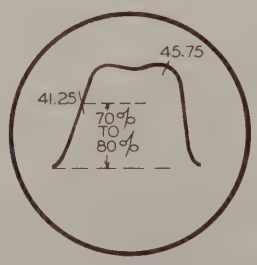


FIG.2

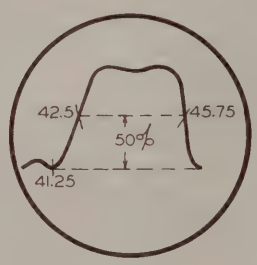
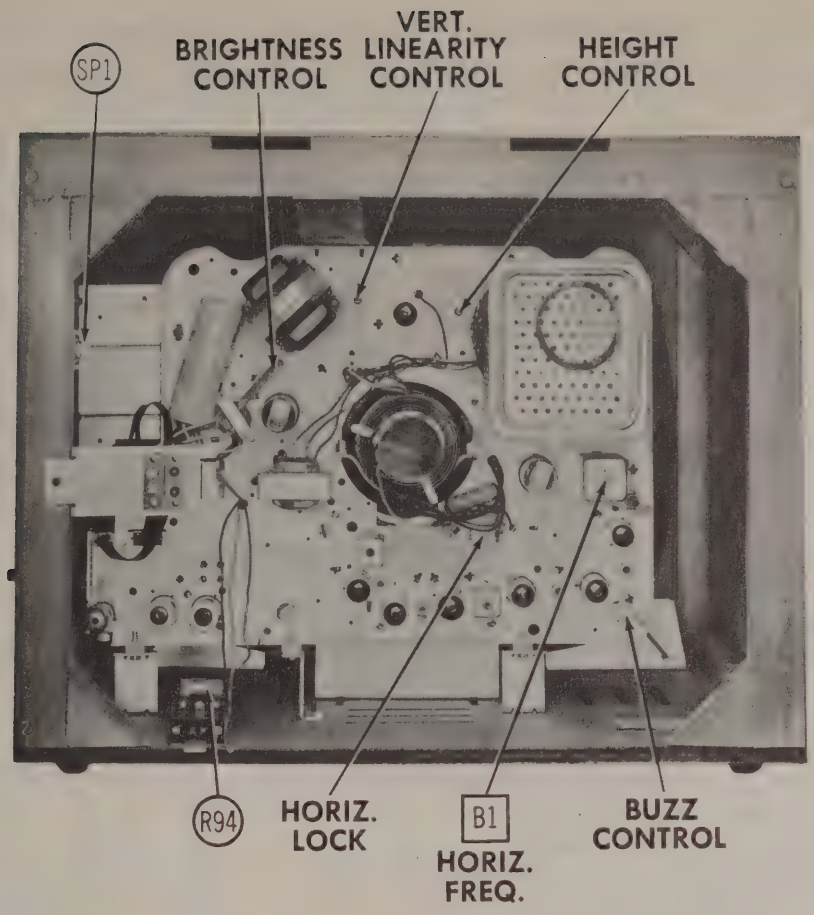


FIG.3



PROPERTY OF
L. F. BLANKENSHIP
3021 MEADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

1. Preset the horizontal lock trimmer (B3) one-half turn from maximum clockwise position.

2. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

3. Connect the vertical amplifier of the oscilloscope thru a 10MMF to lug "4" of L43. Low side to chassis. Adjust the horizontal waveform slug (B2) until waveform similar to Fig. 4 is obtained. While making this adjustment keep the picture in sync with the horizontal hold and if necessary, B1 and B3.

4. Remove scope connections from lug "4" of L43.

5. Turn the horizontal hold control fully counter clockwise. Turn B1 counter clockwise until the picture just loses sync, then turn B1 clockwise until picture is just ready to pull-in sync.

6. Turn the horizontal hold control fully clockwise. Picture should remain in sync. Momentarily remove signal by switching off channel and back again. If more than 7 diagonal bars are present, adjust B3 slightly counter clockwise until 3 or 4 diagonal bars appear when switching off channel and back again. If less than 3 bars are present when switching off channel and back again, adjust B3 slightly clockwise until 3 or 4 bars are present when switching off channel and back again. Repeat steps 5 and 6 until the effective pull-in range of the horizontal hold control is from 60 to 120 degrees.

7. In weak signal areas adjust the horizontal hold control so that when switching off channel and back again the picture returns completely in sync.

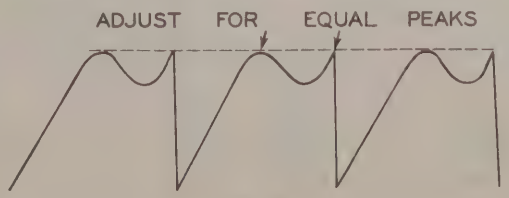
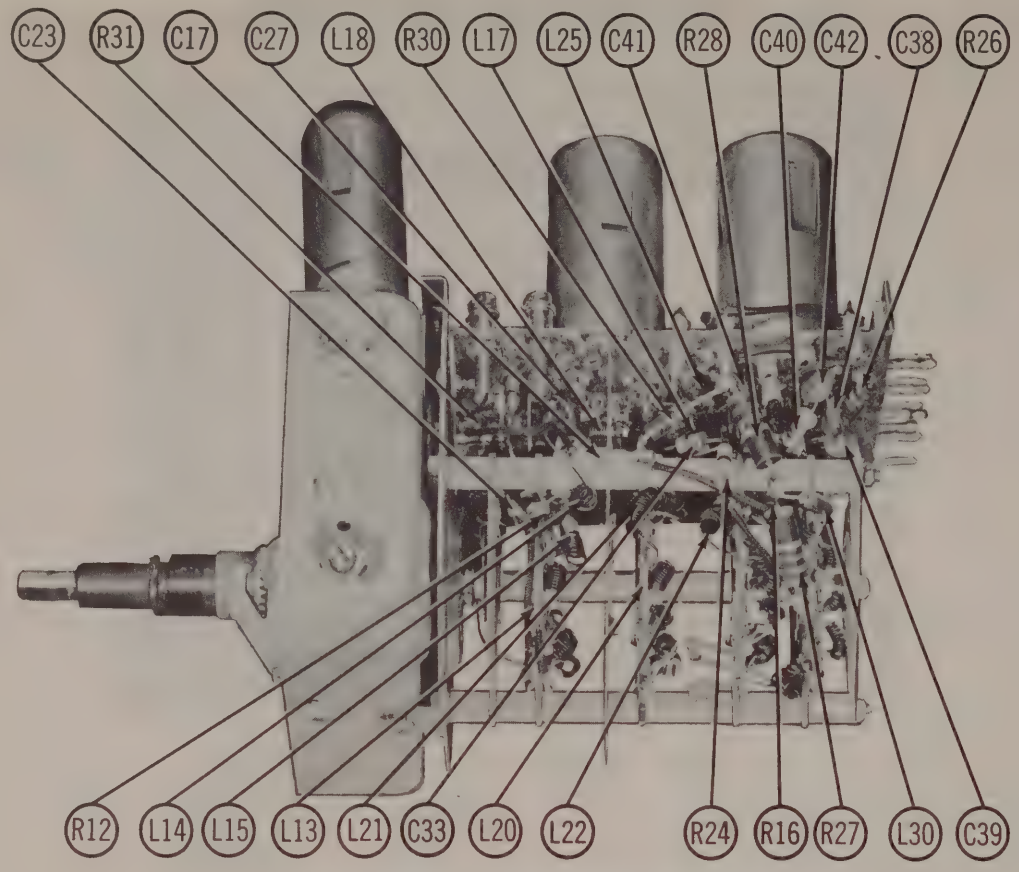
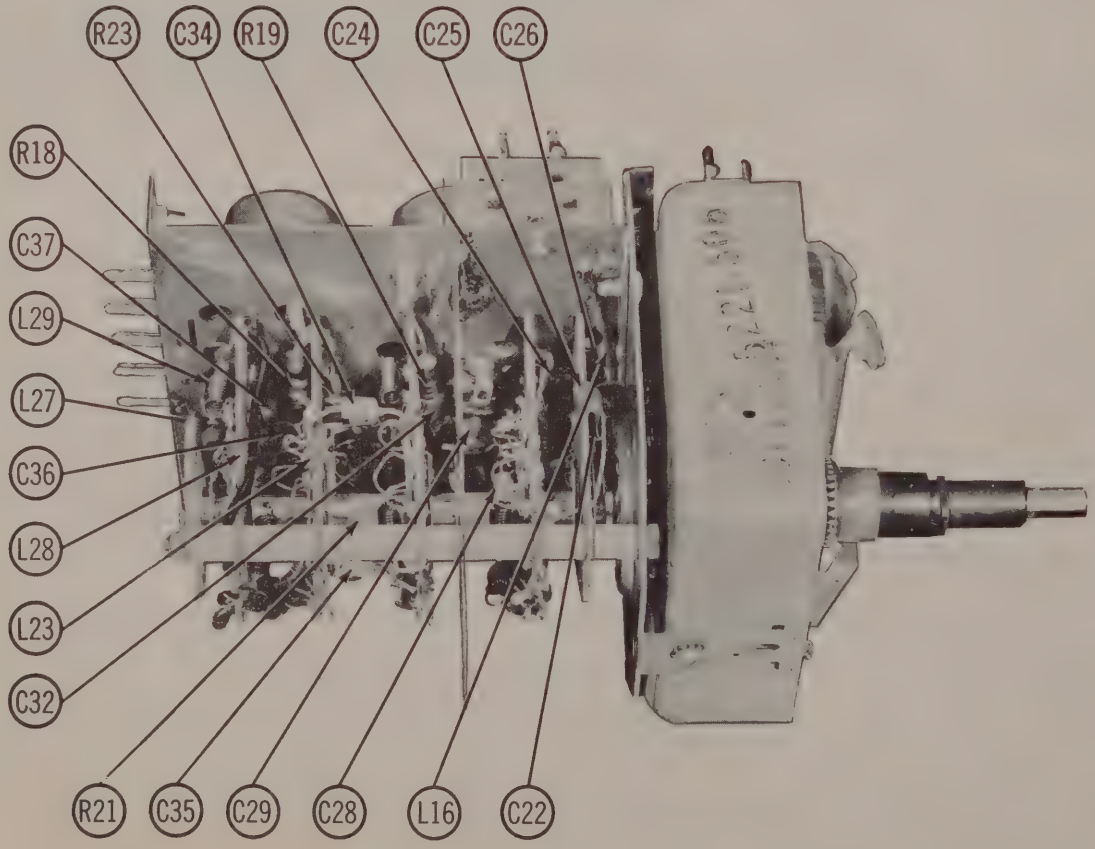


FIG. 4



UHF-VHF TUNER-RIGHT SIDE



UHF-VHF TUNER-LEFT SIDE

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Hallicrafters PART No.	STANDARD REPLACEMENT		
V1	UHF Osc.	6AF4	6AF4	7DK	
V2	RF Amp.	6BZ7	6BZ7	9AJ	
V3	VHF Mixer-Osc.	6U8	6U8	9AE	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp+ Video Det.	6AM8	6AM8	9CY	
V7	Video Output- Sync Sep.	6AN8	6AN8	9DA	
V8	Sound IF Amp.- Sync Amp.	6U8	6U8	9AE	
V9	Audio Detector	6BN6	6BN6	7DF	
V10	Audio Output	25L6GT	25L6GT	7S	
V11	Vert. Osc.- Vert. Output	12BH7	12BH7	9A	
V12	Horiz. AFC- Horiz. Osc.	6SN7GT	6SN7GT	8BD	
V13	Horiz. Output	6CU6	6CU6	6AM	
V14	Damper	6AX4GT	6AX4GT	4CG	
V15	HV Rectifier	1X2B	1X2B	9Y	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	Hallicrafters PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V16	90X21ALP4A ①	21ALP4A ①	21ALP4A ①	21ALP4A ②	21ALP4A ①	12L	① Aluminized
		21ALP4	21ALP4	21ALP4	21ALP4	12L	② Silver screen

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	Hallicrafters PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	200	150	45B265			WS342	TD-200-200	S-110	
C2A	140	300	45B263			WQ505	CDB-1008	Q-162	
B	200	150							
C	5	300							
D	30	150							
C3A	200	150	45B260			WD345	TDL-205	D-088	
B	5	150							
C4	20	450	45B261			TC75	TD-20-450	FM-4520	
C5	470	500	47X20B471M	D6-471	GP2K-471	MC245			
C6	470	500	47X20B471M	D6-471	GP2K-471	MC245			
C7	170								
C8	170								
C9	1000			MFT-1000					
C10	1000			MFT-1000					
C11	1-4			829-4	3115-01-10	CT551			
C12	1.1			TCZ-1	NP0A-010				
C13	3.3								
C14	1000			DD-102	801-001	DC-521			
C15	470	500	47X20B471M	D6-471	GP2K-471	MC245			
C16	470	500	47X20B471M	D6-471	GP2K-471	MC245			
C17	1000			MFT-1000					
C18	150			DD-151	GP2K-151	UC-5315			
C19	15								
C20	5-10								
C21	5-10								
C22	18			TCZ-18	NP0K-180				
C23	15			DD-150	GP1K-150	UC-5415			
C24	6.8			TCZ-6R8	NP0A-6R8	ZT-5568			
C25	1000			DD-102	801-001	DC-521			
C26	6.8			TCZ-6R8	NP0A-6R8	ZT-5568			
C27	4								
C28	2.7								
C29	1000			DD-102	801-001	DC-521			
C30	1000			MFT-1000					
C31	1000			MFT-1000					
C32	1000			DD-102	801-001	DC-521			
C33	3			TCZ-3R3	NP0A-030	ZT-5533			
C34	.56								
C35	.91								
C36	15			DD-150	GP1K-150	UC-5415			
C37	1.2								
C38	10								
C39	10								
C40	1.5			TCZ-1R5	NP0A-1R5	ZT-5515			
C41	1000			DD-102	801-001	DC-521			
C42	1000			DD-102	801-001	DC-521			
C43	5								
C44	75								
C45	1000			DD-102	801-001	DC-521			
C46	1000			MFT-1000					
C47	1000			MFT-1000					
C48	1000			MFT-1000					
C49	.05	200	46AU503J	DF-503		PT415	IMP2-S5	330215	
C50	5000		47A168	DD-502	811-005	DC-525		C-1250	
C51	1000		47A230	DD-102	801-001	DC-521		K-1210	
C52	24		47CA20A240J	TCZ-24	NP0L-240	ZT-5425		KR-1425	
C53	5000		47A168	DD-502	811-005	DC-525		C-1250	
C54	1000		47A230	DD-102	801-001	DC-521		K-1210	
C55	1000		47A230	DD-102	801-001	DC-521		K-1210	
C56	39			TCZ-39	NP0L-390	MCB223		KR-1439	
C57	24		47CA20A240J	TCZ-24	NP0L-240	ZT-5425		KR-1424	
C58	1000		47A230	DD-102	801-001	DC-521		K-1210	
C59	1000		47A230	DD-102	801-001	DC-521		K-1210	
C60	5000		47A168	DD-502	811-005	DC-525		C-1250	
C61	1000		47A230	DD-102	801-001	DC-521		K-1210	
C62	10		47CA20100F	D6-100	GP1K-100	UC-541		K-1410	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Hallicrafters PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C63	4.7		47A160-6	TCZ-4R7	NP0A-4R7	ZT-555		KR-1550	
C64	.25	100	46A242			PT4025	IMP2-P25	3302025	
C65	.1	150	46A243	DF-104		PT401	IMP2-P1	330201	
C66	33		47A478						
C67	.1	400	46AV104J	DF-104		PT401	IMP4-P1	330401	
C68	4.7		47A160-6	TCZ-4R7	NP0A-4R7	ZT-555		KR-1550	
C69	68		47A479						
C70	5000		47A168	DD-502	811-005	DC-525		C-1250	
C71	33		47A478						
C72	5000		47A168	DD-502	811-005	DC-525		C-1250	
C73	.01	400	46AU103J	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C74	15		47A480	TCN-15	N750K-150	NT-5415			
C75	1000		47A230	DD-102	801-001	DC-521		K-1210	
C76	.02	200	46AZ203J	DF-203	817-02	PT412	IMP2-S2	330212	
C77	.02	600	46AU203J	DF-203	817-02	PT612	IMP6-S2	330612	
C78A	270		†49A046	†PC-263	GP2K-271	UC-5327		K-1327	
B	10000				811-01	DC-511		330611	
C	25				GP1K-250	UC-5425		K-1425	
C79	.05	200	46AU503J	DF-503		PT415	IMP2-S5	330215	
C80	33		47CA20A330M	D6-330	GP1K-330	UC-5433		K-1433	
C81A	4700		♦49A044	♦PC-106	811-005	DC-525	IMP6-D5	C-1250	
B	4700				811-005	DC-525	IMP6-D5	C-1250	
C82	.01	400	47A224	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C83	470		47CA20471K	D6-471	GP2K-471	UC-5347	IMP6-T5	K-1347	
C84	.047	400	46BR473L4	DF-503		PT4147	IMP4-S47	3304147	
C85	5000		47A168	DD-502	811-005	DC-525	IMP6-D5	C-1250	
C86	20		47CA20200K	D6-200	GP1K-200	UC-542		K-1420	
C87	.05	400	46AW503J	DF-503		PT415	IMP4-S5	330415	
C88	.02	200	46AU203J	DF-203	817-02	PT412	IMP2-S2	330212	
C89	.25	100	46A242			PT4025	IMP2-P25	3302025	
C90	33		47A478						
C91	220	500	47X20B221K	D6-221	811-221	MCB240		KR-1322	
C92	.01	400	46C244	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C93	20000		47A242	DF-203	817-02	PT612	IMP6-S2	330612	Note 1
C94	1300	500	47X30B132K					CR-1213	
C95	.05	400	46AW503J	DF-503		PT415	IMP4-S5	330415	
C96	10000		46BR103E4	DD-103	811-01	DC-511	IMP6-S1	330611	
C97	56	3000	47A555	DD30-560	3KV-560	DC30456		K-4456	Note 2
C98	.08	200	46AU803J					330618	
C99	68	3000		DD30-680	3KV-680	DC30468			
C100	5000	1000	47A485	DD-502					
C101	100	3000	47A570	DD30-101	3KV-101	DC3031		K-3310	Note 3
C102	100	3000	47A570	DD30-101	3KV-101	DC3031		K-3310	Note 3

† Items C78A, C78B, C78C, R63A and R63B are combined in one unit.
♦ Items C81A, C81B, R69A and R69B are combined in one unit.
Note 1. Run 1 chassis use 1000MMF in this application (part #47A503).
Note 2. Run 1 chassis use 68MMF in this application (part #47B473). Not used in Run 3 or 3A chassis.
Note 3. Use in Run 3 and 3A chassis only.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1.25Meg	½	25B1097	Q11-137 ♦	A47-1Meg-S ♦	B-69 ♦	U-155 ♦	Vert. Hold (stop Ⓐ 350KΩ)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R1A	1.25Meg	½	25B1176	Q11-137 ♦	A47-1Meg-S ♦	B-69 ♦	U-155 ♦	Vert. Hold (stop Ⓐ 350KΩ) - Note 1
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	145KΩ	½	25B1100	Q11-125 †	A47-75K-S †	B-35 †	U-43 †	Horiz. Hold (stop Ⓐ 70KΩ)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	330KΩ	½	25B1101	Q13-132	A47-500K-Z	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R3A
R4A	1500Ω	½	25B1102	Q17-109		AB-515	U-5	Contrast
B	Shaft		Not Req.	Not Req.		AK-3	Not Req.	Attach to R4A
R5A	5Meg	½	25B1096	Q17-141				Brightness
B	Shaft		Not Req.	SQ				Attach to R5A
R6A	750Ω	½	25B1099	Q11-105	A47-750-S	AB-5	U-4	Vert. Linearity
B	Shaft		Not Req.	SQ	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	5Meg	½	25B1098	Q11-141 **	A47-4Meg-S**	AB-86 **	SU-67 **	Height (Stop Ⓐ 1Meg)
B	Shaft		Not Req.	SQ	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8	500Ω	2	25A1095		39-500			Buzz

♦ Connect a 350KΩ resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
** Connect a 1Meg resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
† Connect a 70KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
Note 1. Used as an alternate in some versions.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R9	470KΩ	½	23X20X474K		
R10	470KΩ	½	23X20X474K		
R11	10KΩ	½			
R12	1000Ω	½		BTS-1000	
R13	270Ω	½		BTS-270	
R14	470KΩ	½	23X20X474K		
R15	470KΩ	½	23X20X474K		
R16	100KΩ	½			
R17	1Meg	½			
R18	750KΩ 5%	½		BTS-750K 5%	
R19	470Ω	½		BTS-470	
R20	6800Ω	½			
R21	10KΩ	½			
R22	10KΩ	½			
R23	470KΩ	½			
R24	10KΩ	½			
R25	1000Ω	½		BTS-1000	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R26	15KΩ	½			
R27	2200Ω	1		BTA-2200	
R28	2200Ω	1		BTA-2200	
R29	100Ω	½		BTS-100	
R30	150KΩ	½		BTS-150K	
R31	56Ω	½		BTS-56	
R32	1000Ω	½		BTS-1000	
R33	1000Ω	½	23X20X102K	BTS-1000	
R34	2700Ω	½	23X20X272K	BTS-2700	
R35	4700Ω	½	23X20X472K	BTS-4700	
R36	47Ω	½	23X20X470K	BTS-47	
R37	1000Ω	½	23X20X102K	BTS-1000	
R38	18KΩ	½	23X20X183K		
R39	1000Ω	½	23X20X102K	BTS-1000	
R40	47Ω	½	23X20X470K	BTS-47	
R41	1000Ω	½	23X20X102K	BTS-1000	
R42	220Ω	½	23X20X221K	BTS-220	
R43	12KΩ	½	23X20X123K		

PARTS LIST AND DESC

RESISTO

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R44	180Ω	½	23X20X181K	BTS-180	
R45	1000Ω	½	23X20X102K	BTS-1000	
R46	1000Ω	½	23X20X102K	BTS-1000	
R47	1Meg	½	23X20X105K	BTS-1Meg	
R48	5600 5%	½	23X20X562K		
R49	1Meg	½	23X20X105K		
R50	39KΩ	1	23X30X393K		
R51	47KΩ	1	23X30X473K	BTA-47K	
R52	10KΩ	2	23X40X103K		
R53	18KΩ	1	23X30X183K		
R54	100KΩ	½	23X20X104K		
R55	150Ω	½	23X20X151K	BTS-150	
R56	18KΩ	½	23X20X183K	BTS-18K	
R57	5600Ω	1	23X30X562K	BTA-5600	
R58	470Ω	½	23X20X471K	BTS-470	
R59	470KΩ 5%	½	23X20X474J	BTS-470K 5%	
R60	560KΩ 5%	½	23X20X564J	BTS-560K 5%	
R61	8200Ω	½	23X20X822K	BTS-8200	
R62	10KΩ	½	23X20X103K		
R63A	220KΩ	½	†49A046		
B	2.2Meg	½			
R64	820KΩ	½	23X20X824K		
R65	680KΩ	½	23X20X684K		
R66	22KΩ	½	23X20X223K		
R67	6800Ω	1	23X30X682K		
R68	4700Ω	½	23X20X472K		
R69A	22KΩ	½	♦49A044		
B	10KΩ	½			

† Items R63A, R63B, C78A, C7
♦ Items R69A, R69B, C81A, C8
Note 1. R89 is replaced with a 4
Note 2. R96 is used only in Run
Note 3. R91 and R93 not used in
Note 4. R97 is used only in Run

TRANSFORMER

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	Hallicrafters PART No.	Halldorson PART No.
T1	117VAC Ⓐ .55A tap Ⓐ 25VAC Ⓐ .32A tap Ⓐ 6.3VAC Ⓐ 6A	6.3VAC Ⓐ 1.2A		52C322 52C341 ①	

① Alternate filament transformer.

TRANSFORMERS (SV

ITEM No.	USE	Hallicrafters PART No.	Halldorson PART No.	Merit PART No.
T2	Vert. Osc. Trans.	55B250		A-3006
T3	Horiz. Output Trans.	55B266 ①	FB418 *	HVO-37 *
		55B253 ②④	FB418 *	
		55D270 ③	FB418 *	
T4	Vert. Output Trans.	55C260		A-2824
T5A	Yoke (90°) Horiz. (20MH)	53D325 ⑤	DF607 ⑥ ⑦ ⑧	MDF-92 ⑥ ⑦ ⑧
B	Vert. (40MH)			

① Used in chassis stamped Run 2, 2A.
② Used in chassis stamped Run 1.
③ Used in chassis stamped Run 3, 3A.
④ Includes coil L44.
⑤ Includes capacitor C99, resistors R76 and R77.
⑥ Use original rear cover and centering device.
⑦ Use original horizontal yoke damping network.
⑧ Jumper terminals #3 and #5.

*HORIZONTAL OUTPUT TRAN

Use Original Width Coil Unle

	ORIGINAL TERMINAL CONNECTIONS			Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacem Connecti
	4	4	4	6	6	
	7	3	5	3	3	
	2	2	NC	5	5	
	6	5	6	2	2	
Special Notes →	⑨	⑩	⑪			

⑨ Connections for part #55B266 .
⑩ Connections for part #55B253.
⑪ Connections for part #55D270.
NC - NO CONNECTION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA Hallicrafters PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C83	4.7		47A160-5	TCZ-4R7	NP0A-4R7	ET-555		KR-1550	
C84	.25	100	46A242			PT4025	IMP2-P25	3302025	
C85	.1	150	46A243	DF-104		PT401	IMP2-P1	390201	
C86	39		47A115						
C87	.1	600	46AY1047	DF-104		PT401	IMP4-P1	330401	
C88	4.7		47A160-4	TCZ-4R7	NP0A-4R7	ET-555		KR-1550	
C89	68		47A418						
C70	5000		47A188	DD-503	811-005	DC-535		C-1350	
C71	33		47A178						
C72	5000		47A188	DD-503	811-005	DC-535		C-1350	
C73	.01	400	46AU103J	DF-103	GP3-333-103	PT411	IMP4-S1	330411	
C74	18		47A401	TCH-15	N750K-150	ET-5418			
C75	1000		47A230	DD-102	801-001	DC-521		K-1210	
C76	.02	200	46AZ203J	DF-203	817-03	PT412	IMP2-S2	330212	
C77	.02	600	46AU203J	DF-203	817-02	PT912	IMP6-S2	330612	
C78A	270			GP2K-471	UC-5327			K-1327	
B	10000		†46A046	†PC-363	811-01	DC-511		330611	
C	25				GP1K-250	UC-5425		K-1425	
C79	.05	200	46AU503J	DF-503		PT415	IMP2-S5	330215	
C80	33		47CA30A330M	D6-330	GP1K-330	UC-5433		K-1433	
C81A	4700		⊕46A044	⊕PC-106	811-005	DC-525	IMP6-D5	C-1250	
B	4700				811-005	DC-533	IMP6-D5	C-1250	
C83	.01	400	47A334	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C84	470		47CA471M	D6-471	GP2K-471	UC-5347	IMP6-T5	K-1347	
C84	.047	400	46SR4731J	DF-503		PT4147	IMP4-S47	3304147	
C85	5000		47A168	DD-502	811-005	DC-535	IMP6-D5	C-1250	
C86	20		47CA200K	D6-200	GP1K-500	UC-5432		K-1430	
C87	.05	400	46AW503J	DF-503		PT415	IMP4-S5	330415	
C88	.02	200	46AU203J	DF-203	817-02	PT412	IMP2-S2	330212	
C89	.25	100	46AZ42			PT4025	IMP2-P25	3302025	
C90	33		47A478						
C91	220	500	47CX00J22U	D6-221	811-221	MC1240		KR-1229	
C92	.01	400	46C244	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C93	20000		47A242	DF-203	817-02	PT912	IMP6-S2	330612	Note 1
C94	1000	500	47X300J152K					C-1152	
C95	.05	400	46AW503J	DF-503		PT415	IMP4-S5	330415	
C96	10000		46SR103E4	DD-103	811-01	DC-511	IMP6-S1	330611	
C97	56	3000	47A585	DD50-560	XKV-560	DC30456		K-4456	Note 2
C98	.08	200	46AU803J					330618	
C99	68	3000		DD50-680	XKV-680	DC30468			
C100	5000	1000	47A485	DD-502					
C101	100	7000	47A370	DD50-101	XKV-101	DC3031		K-3310	Note 2
C102	100	3000	47A570	DD50-101	XKV-101	DC3031		K-3310	Note 3

† Items C78A, C78B, C78C, R63A and R63B are combined in one unit.
⊕Items C81A, C81B, R68A and R68B are combined in one unit.
Note 1. Run 1 chassis use 1000MMF in this application (part #47A502).
Note 2. Run 1 chassis use 68MMF in this application (part #47B473). Not used in Run 3 or 3A chassis.
Note 3. Use in Run 3 and 3A chassis only.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1.25Meg	½	25B1097	QU-137 *	A47-1Meg-S	B-59 *	U-155 *	Vert. Hold (stop④ 350KΩ)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R1A	1.25Meg	½	25B1176	QU-137 *	A47-1Meg-S	B-59 *	U-155 *	Vert. Hold (stop② 350KΩ) - Note 1
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	145KΩ	½	25B1100	QU-125 †	A47-75K-S †	B-35 †	U-43 †	Horiz. Hold (stop④ 70KΩ)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	3300Ω	½	25B1101	QU3-132	A47-500K-2	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A
C	Switch		Not Req.	TS-1	SWE-13	Not Req.	US-36	Attach to R3A
R4A	1500Ω	½	25B1103	QU7-109		AB-515	U-5	Contrast
B	Shaft		Not Req.	Not Req.		AK-3	Not Req.	Attach to R4A
R5A	5Meg	½	25B1096	QU7-141				Brightness
B	Shaft		Not Req.	SQ				Attach to R5A
R6A	750Ω	½	25B1099	QU-105	A47-750-S	AB-5	U-4	Vert. Linearity
B	Shaft		Not Req.	SQ		FKS-1/4	AK-1	Attach to R6A
R7A	5Meg	½	25B1098	QU-141 **	A47-4Meg-S**	AB-85 **	SU-67 **	Height (Stop④ 1Meg)
B	Shaft		Not Req.	SQ		FKS-1/4	AK-1	Attach to R7A
R8	500Ω	2	25A1095			30-500		Buzz

* Connect a 350KΩ resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
** Connect a 1Meg resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
† Connect a 70KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
Note 1. Used as an alternate in some versions.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R9	470KΩ	½	23X3X0474X		
R10	470KΩ	½	23X3X0474X		
R11	10KΩ	1			
R12	1000Ω		23B1-1000		
R13	270Ω		23B1-270		
R14	470KΩ	½	23X3X0474X		
R15	470KΩ	½	23X3X0474X		
R16	100KΩ				
R17	1Meg				
R18	750KΩ 5%		23B1-750K 5%		
R19	470Ω		23B1-470		
R20	6800Ω				
R21	10KΩ				
R22	10KΩ				
R23	470KΩ				
R24	10KΩ				
R25	1000Ω			23B1-1000	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R26	15KΩ	½			
R27	2200Ω	1		B7A-2200	
R28	2200Ω	1		B7A-2200	
R29	100Ω			B7B-100	
R30	150KΩ			B7B-150K	
R31	560			B7B-56	
R32	1000Ω			B7B-1000	
R33	1000Ω		23X2X0102K	B7B-1000	
R34	2700Ω		23X2X272X	B7B-2700	
R35	4700Ω		23X2X472X	B7B-4700	
R36	47Ω		23X2X470K	B7B-47	
R37	1000Ω		23X2X102K	B7B-1000	
R38	18KΩ		23X2X183K		
R39	1000Ω		23X2X102K	B7B-1000	
R40	47Ω		23X2X470K	B7B-47	
R41	1000Ω		23X2X102K	B7B-1000	
R42	220Ω		23X2X221K	B7B-220	
R43	12KΩ		23X2X123K		

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R44	180Ω	½	23X2X180K	B7B-180	
R45	1000Ω	½	23X3X102K	B7B-1000	
R46	1000Ω	½	23X3X102K	B7B-1000	
R47	1Meg	½	23X2X105X	B7B-1Meg	
R48	5600 5%	½	23X2X562K		
R49	1Meg	½	23X2X105K		
R50	380KΩ	1	23X2X383X		
R51	47KΩ	1	23X3X473K	B7A-47K	
R52	10KΩ	½	23X40X103X		
R53	18KΩ	1	23X2X183X		
R54	100KΩ		23X2X104X		
R55	150Ω		23X2X151K	B7B 150	
R56	18KΩ		23X2X183K	B7B-18K	
R57	5600Ω		23X3X562K	B7A-5600	
R58	470Ω		23X2X471K	B7B-470	
R59	470KΩ 5%	½	23X2X474J	B7B-470K 5%	
R60	560KΩ 5%	½	23X2X564J	B7B-560K 5%	
R61	8200Ω		23X2X822K	B7B-8200	
R62	10KΩ		23X2X103K		
R63A	220KΩ		†48A046		
B	2.3Meg				
R64	820KΩ		23X2X324K		
R65	680KΩ		23X2X684K		
R66	22KΩ		23X2X223K		
R67	68000Ω		23X2X683K		
R68	47000Ω		23X3X472K		
R69A	22KΩ		†48A044		
B	10KΩ				

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Hallicrafters PART No.	IRC PART No.	NOTES
R70	680KΩ	1	23X3X684K		
R71	82KΩ	½	23X42X183K		
R72	68KΩ	½	23X2X683K		
R73	15KΩ	2	23X40X153X		
R74	390KΩ		23X2X394X		
R75	820KΩ		23X3X824K		
R76	560Ω				
R77	560Ω				
R78	560KΩ		23X2X564K		
R79	150KΩ		23X2X154K		
R80	150KΩ		23X2X154K		
R81	82000Ω		23X2X823X		
R82	2.7Meg		23X2X275X		
R83	100KΩ		23X2X104K		
R84	1000Ω		23X2X102K	B7B-1000	
R85	100KΩ		23X2X104K		
R86	18KΩ		23X2X183X		
R87	27KΩ		23X2X273X		
R88	150KΩ		23X2X154K		
R89	390KΩ		23X2X394X		
R90	12KΩ	2	23A097		
R91	100Ω		23X2X101K		Note 3
R92	4700Ω		23X2X472K		
R93	2.2Ω	½			Note 3
R94	7.5Ω	½		15J101	
R95	33KΩ		23X3X333X		
R96	10Ω		23X2X100X	B7S-10	Note 2
R97	4700Ω		23X2X472K		Note 4

† Items R63A, R63B, C78A, C78B and C78C are combined in one unit.
* Items R69A, R69B, C81A C81B are combined in one unit.
Note 1. R89 is replaced with a 470KΩ, ½ watt resistor in Run 1.
Note 2. R96 is used only in Run 1.
Note 3. R91 and R93 not use d in Run 1.
Note 4 . R97 is used only in Run 2 and 2A.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI	RATING SEC 1	RATING SEC 2	REPLACEMENT DATA Hallicrafters PART No.	Hallodorson PART No.	Merit PART No	RCA TYPE No	Stancor PART No	Thordorson PART No	Triad PART No
T1	117VAC ⑨-55A tap ⑧ 35VAC ⑦-.32A tap ⑥ 6.3VAC ⑤-8A	6.3VAC ③-1.2A		52C322 52C341 ①					26F24	

① Alternate filament transformer.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	Hallicrafters PART No.	Hallodorson PART No.	Merit PART No.	RCA TYPE No.	Rom PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T2	Vert.Osc. Trans.	55B250		A-3006					
T3	Horiz.Output Trans.	55B266 ① 55B253 ②④ 55B257 ③	FB418 * FB418 * FB418 *	HVO-37 *	X123 * X123 * X123 *	A-8263 * A-8263 * A-8263 *	FLY-25 * FLY-25 * FLY-25 *	D-48 * D-48 * D-48 *	
T4	Vert.Output Trans.	55C280		A-2834					
T5A	Yoke(90° Horiz. (50KHz) Vert. (40MH)	S3D525 ⑤	DF907① ⑦⑧	MDF-92 ⑥⑦ ⑧		DY-16A ⑦⑧	Y-18 ⑧ ⑦	Y-41-1 ⑥⑦⑧	
B									

① Used in chassis stamped Run 2, 2A.
② Used in chassis stamped Run 3.
③ Used in chassis stamped Run 3, 3A.
④ Includes coil L44.
⑤ Includes capacitor C99, resistors R70 and R77.
⑥ Use original rear cover and centering device
⑦ Use original horizontal yoke damping network.
⑧ Jumper terminals #3 and #5.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL (CONNECTION)	Hallodorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stancor Replacement Connections	Thordorson Replacement Connections	Triad Replacement Connections
4 4	6	6		6	6	6	6
7 3 5	3	3		3	3	3	3
2 2 NC	5	5		5	5	5	5
8 5 6	2	2		2	2	2	2
Special Notes → ⑦ ⑩ ⑪							

⑦ Connections for part #55B266 .
⑩ Connections for part #55B253.
⑪ Connections for part #55D270.
NC - NO CONNECTION

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA Hallicrafters PART No	Hallodorson PART No	Merit PART No	Stancor PART No	Thordorson PART No	Triad PART No	NOTES
T6	2.4KΩ	2.5Ω	55B248	21H01	A-3025	A-3322	26B99 ①	S-12X	① Drill One New Mounting Hole.

SPEAKER

ITEM No	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	REPLACEMENT DATA Hallicrafters PART No	QUAM PART No	NOTES
SP1	4"	PM	3.2Ω	85C175A †	4A07	1 Used in Models 21K341M, 21K341B, 21T321W,
	4"	PM	3.2Ω	85C175 ‡	4A07	21T321M, and 21T321B
	6"	PM	3.2Ω	85C177 ‡	6A1	2 Used in Models 21A331M, and 21K331B

COILS (RF-IF)

ITEM No.	USE	DC RES PRI	DC RES SEC	REPLACEMENT DATA Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant.Coil	0Ω						
L2	UHF Ant.Coil	0Ω						
L3	Fil.Choke	0Ω						
L4	Fil. Choke	0Ω						
L5	Cathode Choke	0Ω						
L6	RF Choke	0Ω						
L7	UHF IF Coupling	0Ω						
L8	VHF Ant. Maich. Trans.	.8Ω	.8Ω					
L9	VHF Ant Maich. Trans.	.8Ω	.8Ω					
L10	IF Trap	.3Ω						
L11	FM Trap	0Ω						
L12	IF Trap	.3Ω						
L13	VHF Ant. Coils	0Ω						
L14	VHF Ant. Coil	0Ω						Channel 13
L15	UHF IF Coil	0Ω						
L16	UHF IF Coil	0Ω						
L17	Fil. Choke	0Ω						
L18	Neut. Coil	0Ω						
L19	VHF RF Coil	0Ω						Channel 13
L20	VHF RF Coils	0Ω						
L21	UHF Coil	0Ω						
L22	RF Choke	0Ω						
L23	VHF Mixer Grid Coils	0Ω						
L24	VHF Mixer Grid Coil	0Ω						Channel 13
L25	Fil. Choke	0Ω						
L26	Osc. Coil	0Ω						Channel 13
L27	RF Choke	0Ω						
L28	Osc.Coils	0Ω						
L29	Osc. Coil	0Ω						Channel 6
L30	RF Choke	0Ω						
L31	Conv Plate	.1Ω						
L32	1st. Video IF	.1Ω		51A1026	17-4504 *	TV-125 m	6234 m	
L33	2nd. Video IF	.1Ω		51A1025	17-4501 *	TV-130 ▲	6225	
L34	Fil. Choke	0Ω		53A282	19-3001		6175	.4 Microhenries
L35	3rd. Video IF	.1Ω		51A1027	17-4500	TV-132	6231	Includes 41.25MC trap
L36	4th. Video IF	.3Ω	.2Ω	50A654	17-5004 ▲	TV-125 m	6234 m	
L37	Series Peaking Coil	4Ω		53A307	19-1006		6634	16 Microhenries
L38A	4.5MC Trap	2.8Ω		51A1858				
B	1st.Sound IF	.8Ω						
L39	Shunt Peaking Coil	1.7Ω		51C1875	19-4950 †		6157 †	975 Microhenries, wound on 15KΩ resistor
L40	Series Peaking Coil	1Ω		51C1876	19-3500 *		6138 *	465 Microhenries, wound on 68KΩ resistor
L41	2nd.Sound IF	1.7Ω	3.5Ω	51A1859				
L42	Quadrature Coil	4.8Ω		51A1857	20-1005	TV-151	1680	
L43	Horiz.Osc.	15Ω	38Ω	50C648	20-1402 #	TV-162 #	6183 #	Waveform winding-35Ω
L44	RF Choke	3.8Ω		53A307	19-1006		6634	16 Microhenries, not used in Run 1
L45	RF Choke	3.8Ω		53A307	19-1006		6634	16 Microhenries, used in Run 1 only

* Detune trap.
■ Use one winding only and use adaptor plate.
▲ Use one winding only.
● Use adaptor plate.
† Parallel with 15KΩ resistor.
‡ Parallel with 68KΩ resistor.
# Reverse coil mounting in can.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ~(V.)	REPLACEMENT DATA Hallicrafters PART No.	Hallodorson PART No	Merit PART No.	Stancor PART No.	Thordorson PART No	Triad PART No.
L46	220ADC	55Ω	.65 HY	56B187	C5040	C-2994	C-2327	26C41	C-21X ①

① Drill one new mounting hole.

HALLICRAFTERS MODELS 21K331B, M, 21K341B, M, 21T321B, M, W (Ch. A1700D) (Runs 1, 2, 2A, 3, 3A)

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

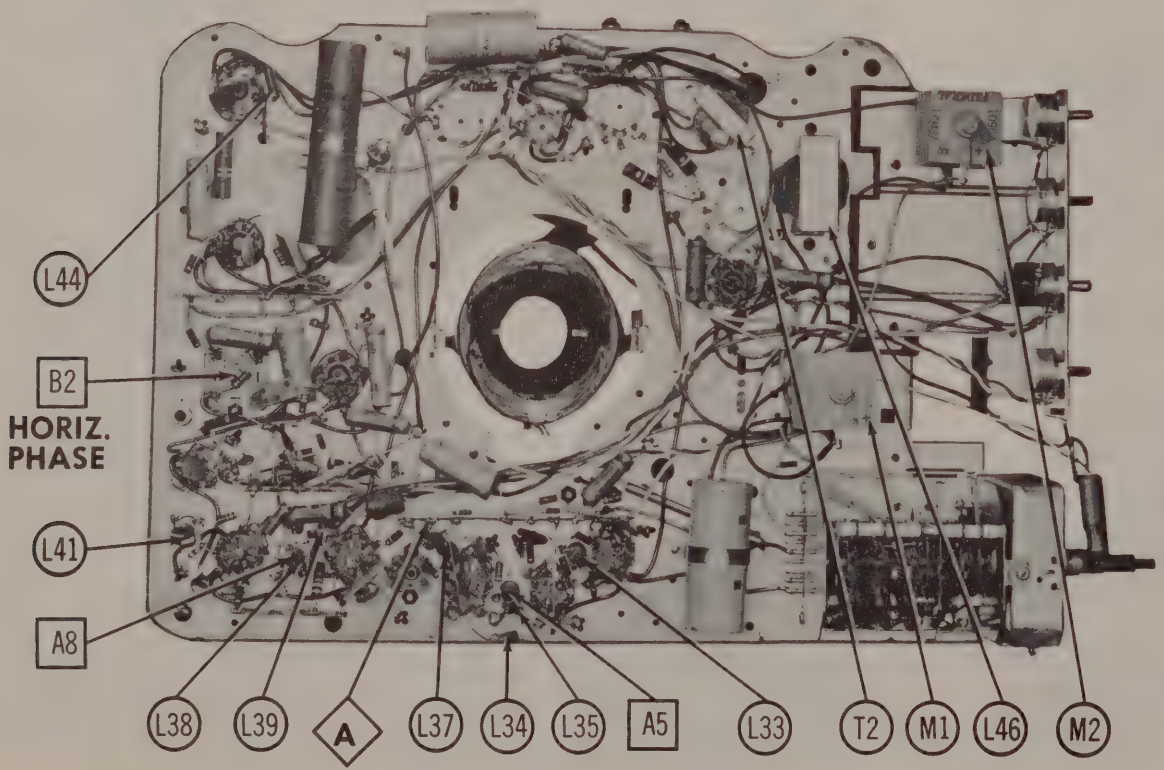
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	Hallicrafters PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.220 ADC	27A173	1236A	RS-250	6S300	6Q4	300	
M2	.220 ADC	27A173	1236A	RS-250	6S300	6Q4	300	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		Hallicrafters PART No.	SYLVANIA PART No.	
M3	ST47	121A433	1N82/1N82A	UHF Mixer

MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M4	Dial Light	39A004	#47 - Not used in some versions
M5	Tuner	1D2170	VHF-UHF combination
M6	Centering Device		Part of Yoke back cover (T5)
M7	Ion Trap	21B189	
B3	Trimmer Cap.	44A448	Horiz. Lock (10-160MMF)
	Cabinet	78A1129	Model 21T321W
	Cabinet	78A1139	Model 21T321M
	Cabinet	78A1140	Model 21T321B
	Cabinet	78A1172	Model 21K331M
	Cabinet	78A1173	Model 21K331B
	Cabinet	78A1174	Model 21K341M
	Cabinet	78A1175	Model 21K341B
	Knob	15A824	Channel Selector - Models 21T321W, 21T321M, 21K331M, 21K341M
	Knob	15A825	Channel Selector - Models 21T321B, 21K331B, 21K341B
	Knob	15A826	VHF Fine tuning - Models 21T321W, 21T321M, 21K331M, 21K341M
	Knob	15A827	VHF Fine tuning - Models 21T321B, 21K331B, 21K341B
	Knob	15B828	UHF tuning - Models 21T321W, 21T321M, 21K331M, 21K341M
	Knob	15B829	UHF tuning - Models 21T321B, 21K331B, 21K341B
	Knob	15A834	Control (4 used) - Models 21T321W, 21T321M, 21K331M, 21K341M
	Knob	15A833	Control (4 used) Models 21T321B, 21K331B, 21K341B
	Knob Insert	15C830	UHF Calibrated - All models
	Safety Glass	22A424	
	Mask	7E575	Model 21T321W
	Mask	7A584	Models 21T321M, 21T321B, 21K331M, 21K331B
	Mask	7A575	Models 21K341M, 21K341B



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

COMPARISON OF A1700D SERIES CHASSIS

The A1700D, Run 1 chassis may be considered the basic chassis in the A1700D Series. Run numbers shown below will indicate variations from this standard by one or more modifications.

CHASSIS	PICTURE TUBE SIZE & TYPE	TYPE OF HEATER CIRCUIT	TUNER	MODIFICATIONS USED
A1700D				
Run 1	21" Glass	Filament Trans.	1D2170	
Run 2	"	" "	"	I
Run 2A	"	" "	"	I, II
Run 3	"	" "	"	I, III
Run 3A	"	" "	"	I, II, II

MODIFICATION I

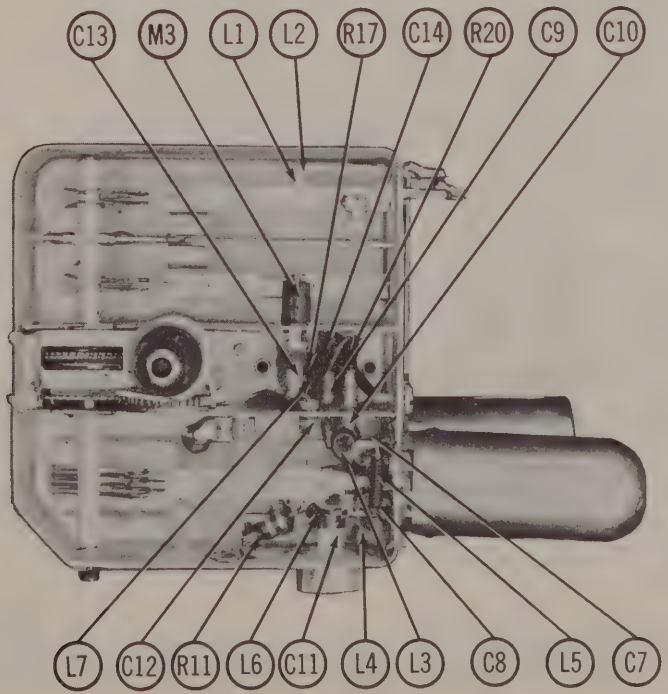
LOCATION OF CHANGE	CHANGE MADE
A. Grid (pin 5) of Horizontal Output. B. Cathode (pin 8) of Horizontal Output C. Horizontal sweep coupling. D. Pin 7 of Horizontal Output Transformer E. Horizontal Output Stage F. Cathode (pin 3) of Damper G. Grid (pin 5) of Horizontal Output	R89 decreaded from 470KΩ to 390KΩ. R96 is deleted C93 replaced by .02MFD, 500V ceramic disc part #47A242. C97 decreased from 68MMF to 56MMF part #47A555. T3 changed to part #55B266. (See Parts List for replacement data. L45 added. C94 removed from junction of L43 and C93 and connected to pin 5 of V13.

MODIFICATION II

LOCATION OF CHANGE	CHANGE MADE
A. Low voltage power supply. B. Audio Output	T1 changed to part #52C341 which is identical, except the tap for V10 is a 12 volt tap. V10 (25L6GT) replaced by 12L6GT.

MODIFICATION III

LOCATION OF CHANGE	CHANGE MADE
A. Horizontal output stage. B. Pin 7 of horizontal output transformer. C. Deflection yoke.	T3 changed to part #55D270. (See Parts List for replacement data). C97 is deleted. C101 and C102 added across the horizontal windings of the deflection yoke.



UHF TUNER FRONT VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the cabinet from the chassis (See disassembly instructions).

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 5 wood screws holding plastic strip at the top of the safety glass. Remove plastic strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the set. Adjustment is located on top of chassis.

Set horizontal hold control at the center of its range and adjust the horizontal frequency coil (L43) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the set.

Adjust the buzz control (R8) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

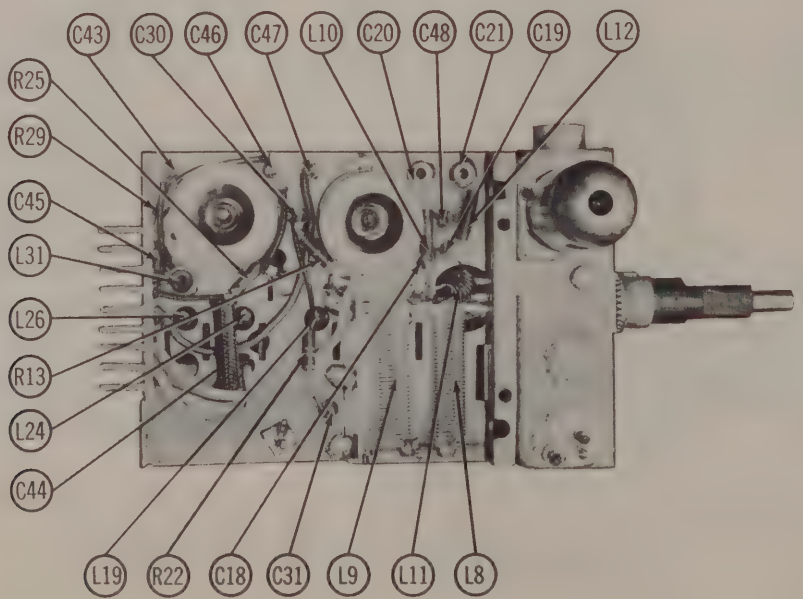
DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL - TABLE MODEL

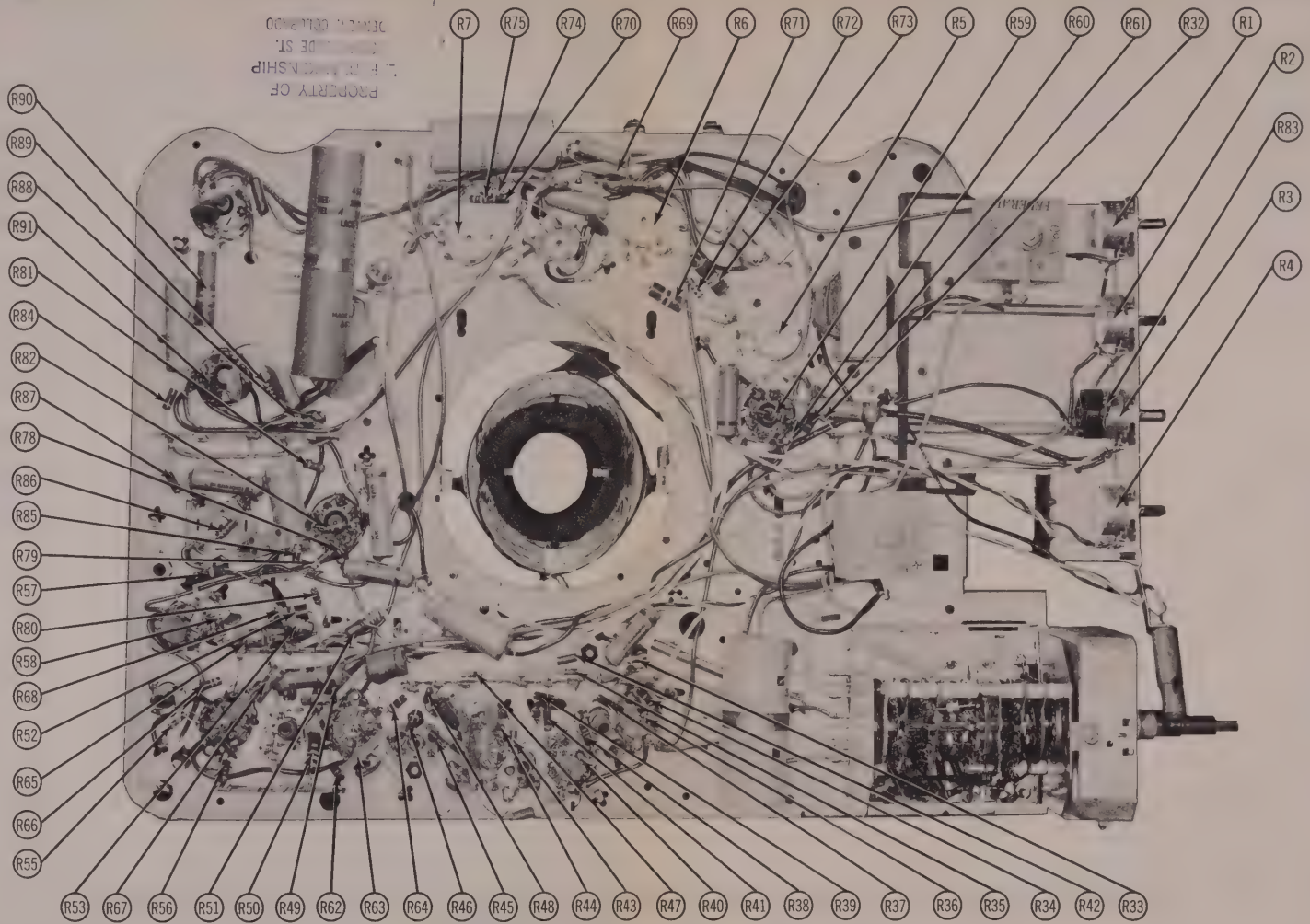
1. Remove 7 push-on type control knobs from side panel of cabinet.
2. Remove 5 wood screws. Remove rear cover.
3. Remove 1 wood screw. Remove antenna bracket.
4. Remove speaker leads.
5. Remove 2 wood screws on the inside rear corners holding mounting board to wood supports on each side of the cabinet.
6. Remove 6 cabinet bolts (3 bolts on each side) from underneath mounting board. Also remove wood screws from under the front center of the mounting board.
7. Lift cabinet straight up off of mounting board.
8. Remove 2 speaker nuts. Remove speaker.

CHASSIS REMOVAL - CONSOLE MODEL

1. Remove 7 push-on type control knob from side panel of cabinet.
2. Remove 5 wood screws. Remove rear cover.
3. Remove 1 wood screw. Remove antenna bracket.
4. Remove speaker leads.
5. Remove 4 chassis mounting board bolts. Remove chassis mounting board.
6. Remove 2 speaker nuts. Remove speaker.



TUNER TOP VIEW



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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*TRADE MARK

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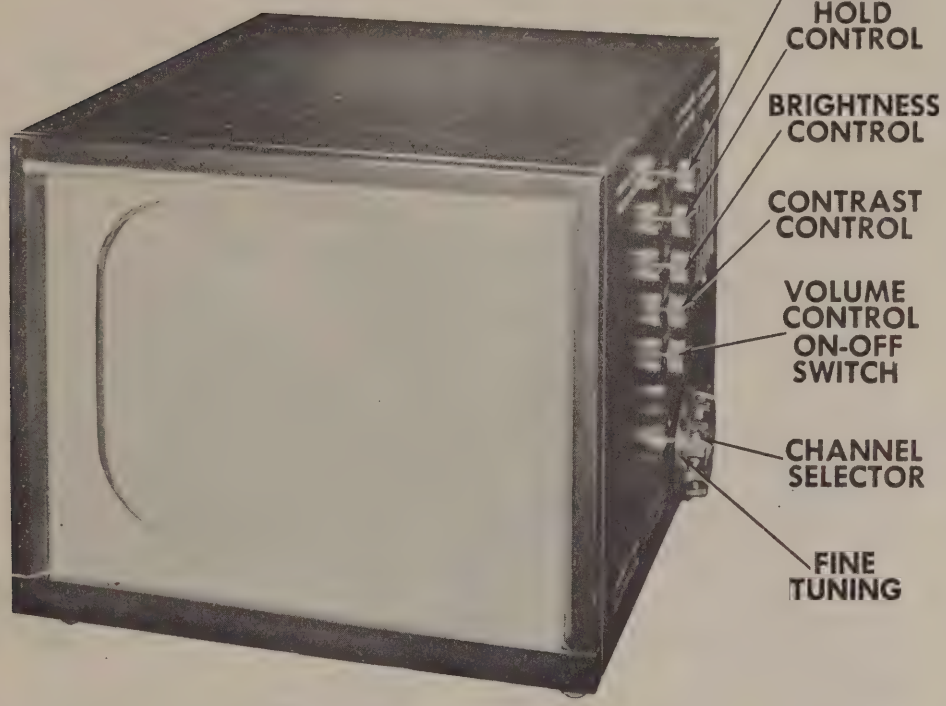

OLYMPIC MODEL 14TD52

TRADE NAME	Olympic Models 14TD30, 14TD31, 14TD52, 14TD53 (Ch. AD), 17KE65, 17KE66, 17TE37, 17TE38 (Ch. AE)
MANUFACTURER	Olympic Radio & Television Inc., 34-01 38th. Ave., Long Island City 1, N.Y.
TYPE SET	Television Receiver
TUBES	Thirteen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .88 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)

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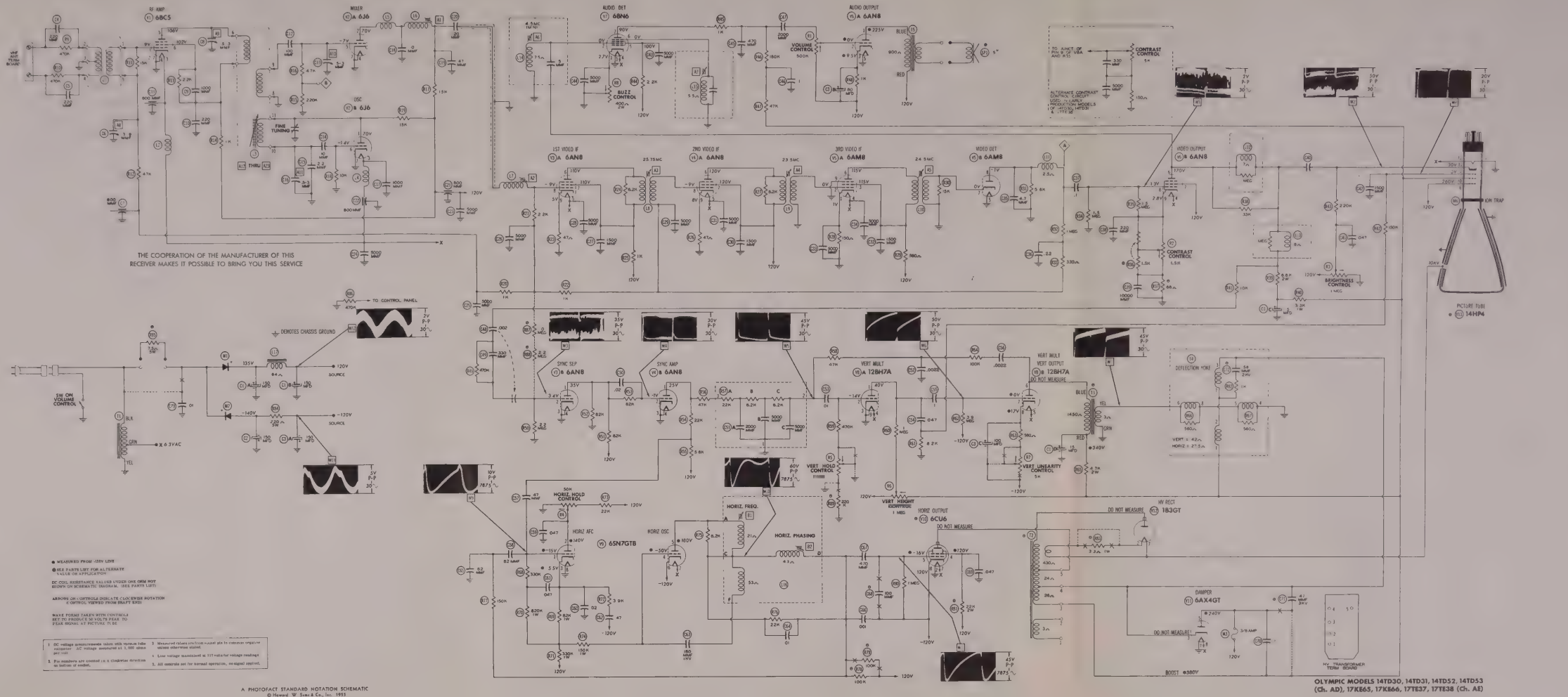
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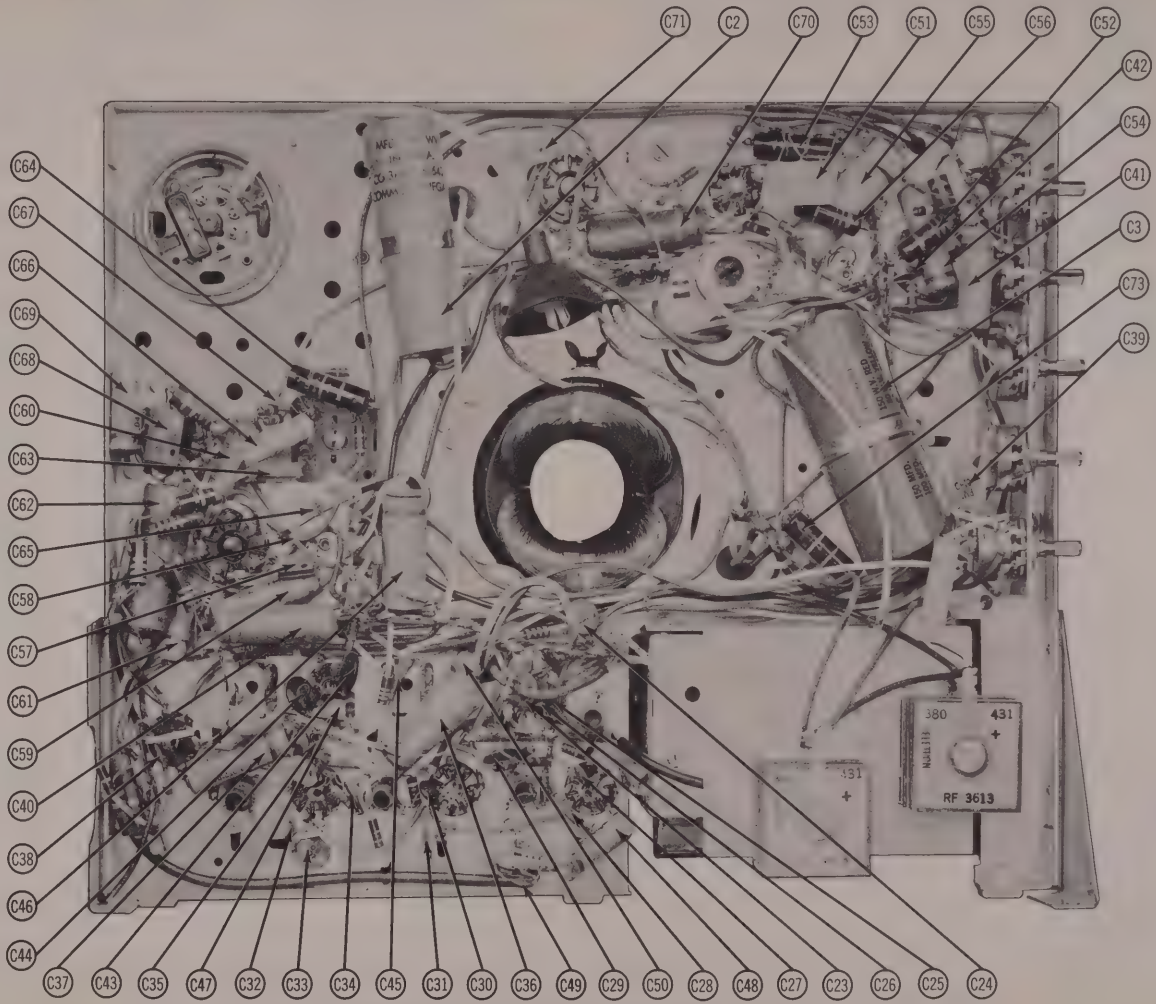
CHASSIS TOP VIEW



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CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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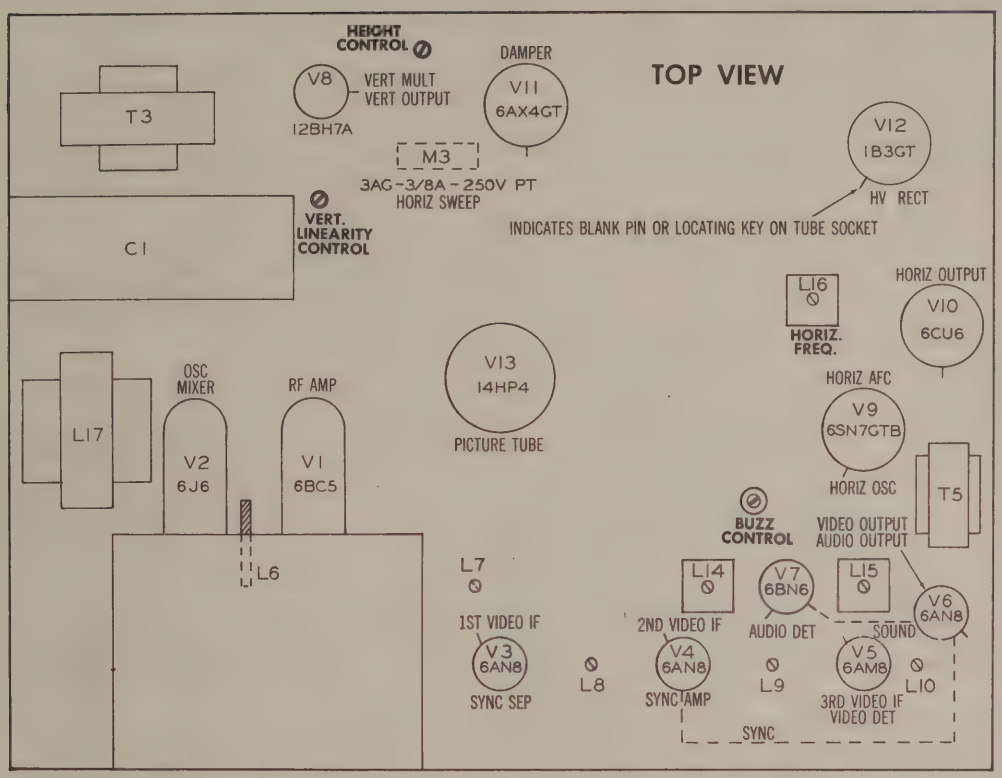


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V13
Has pic, no sound - V6, V7

SYNC FAILURE
No vert. sync - V4, V8
No horiz. sync - V4, V9
No vert. or horiz. sync - V3, V4

SWEEP FAILURE
No raster, has sound - V9, V10, V11, V12, V13, Fuse (M3)
No vertical deflection - V8
Poor vert. linearity or foldover - V8
Poor horiz. linearity or foldover - V9, V10, V11
Narrow picture - V9, V10, V11, V12, M1, M2
Vert. off freq. - V4, V8
Horiz. off freq. - V4, V9

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment. ONE SIDE OF THE 117 VOLT LINE IS CONNECTED DIRECTLY TO CHASSIS. The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis .	24MC (10MC Swp)	22.75MC 26.25MC	Any	Vert. Amp. thru detector (Fig.1) to pin 6 (plate) of 6AN8 (V3A). Low side to chassis.	A1, A2	Remove the third IF tube (V5A) from its socket. Connect a clip lead from the ungrounded side of C36 to chassis. Adjust for response curve similar to Fig. 2 with the 22.75MC and 26.25MC markers above the 80% point on response curve. Both peaks should be of equal height. Replace V5A in its socket. Remove clip lead from C36 and chassis.
2.	"	"	Not used	25.75MC	"	Use VTVM. DC probe to point (A). Common to chassis.	A3	Connect negative lead of a 3 volt bias supply to the ungrounded side of C36. Connect positive lead to chassis. Adjust for maximum deflection. (if oscillation occurs during alignment set A5 counter clockwise until screw projects approximately 3/4".
3.	"	"	"	23.5MC	"	"	A4	"
4.	"	"	"	24.5MC	"	"	A5	Adjust for maximum deflection.
5.	"	"	24MC (10MC Swp)	22.75MC 26.25MC	"	Vert. Amp. to point (A) . Low side to chassis.		Leave bias connected as in in step 2, 3 and 4. Check for response similar to Fig. 3. If necessary, retouch A5 for correct position of 26.25MC marker. Retouch A4 for correct position of 22.75MC marker. Do not retouch A1 or A2 for correct response. Remove bias and replace the original 6J6 in its socket.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point (A) . Low side to chassis.	4.5MC (Unmod)	Any	DC probe thru detector (Fig.4) to pin 11 (cathode) of picture tube. Common to chassis.	A6	Remove V4A from its socket. Adjust contrast control for maximum. Use high signal generator output and adjust A6 for MINIMUM output. Replace V4A in its socket.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a local TV station. Set fine tuning control to bring in a fine herringbone sound beat in the picture. Adjust A6 for minimum 4.5MC beat in the picture.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Turn set on and tune in a strong TV station signal. Set the buzz control (R8) to its mid-range position. Adjust A7 for maximum sound, then adjust R8 for maximum sound and minimum buzz.
Repeat adjustments of A7 and R8 for maximum sound and minimum buzz.

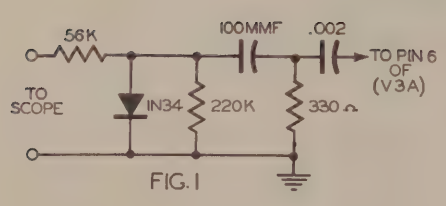


FIG. 1

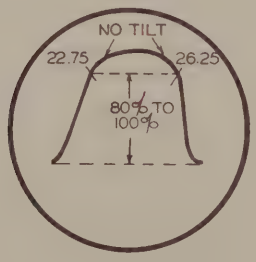


FIG. 2

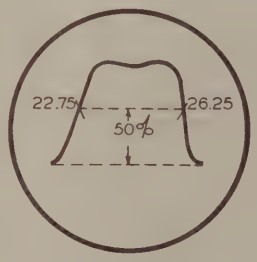


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Connect a clip lead from the ungrounded side of C36 to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A8, A9, A10	Adjust for response similar to Fig. 5 with markers above 90%.
8.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel make compromise adjustment of A8, A9 and A10 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected. Remove clip lead from C36 and chassis.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
Connect bias as under "Video IF Alignment" (Step 2).
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A-11. (This trimmer not used on all models).
It should be noted that this is an all channel oscillator adjustment and should not be used to correct any individual channel. If adjustment of A-11 will not bring all channels well within the range of the fine tuning control, it will be necessary to adjust the channel strip adjustment for each channel that is off frequency.
The channel oscillator adjustment screws are reached thru a hole just to the right of the tuner shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A12	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should fall at 50% on high frequency slope of response curve.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

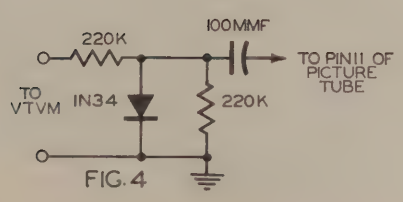


FIG. 4

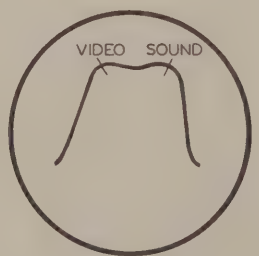


FIG. 5

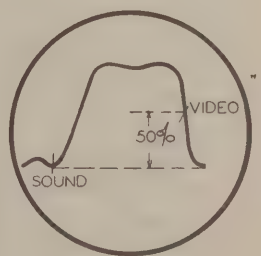


FIG. 6

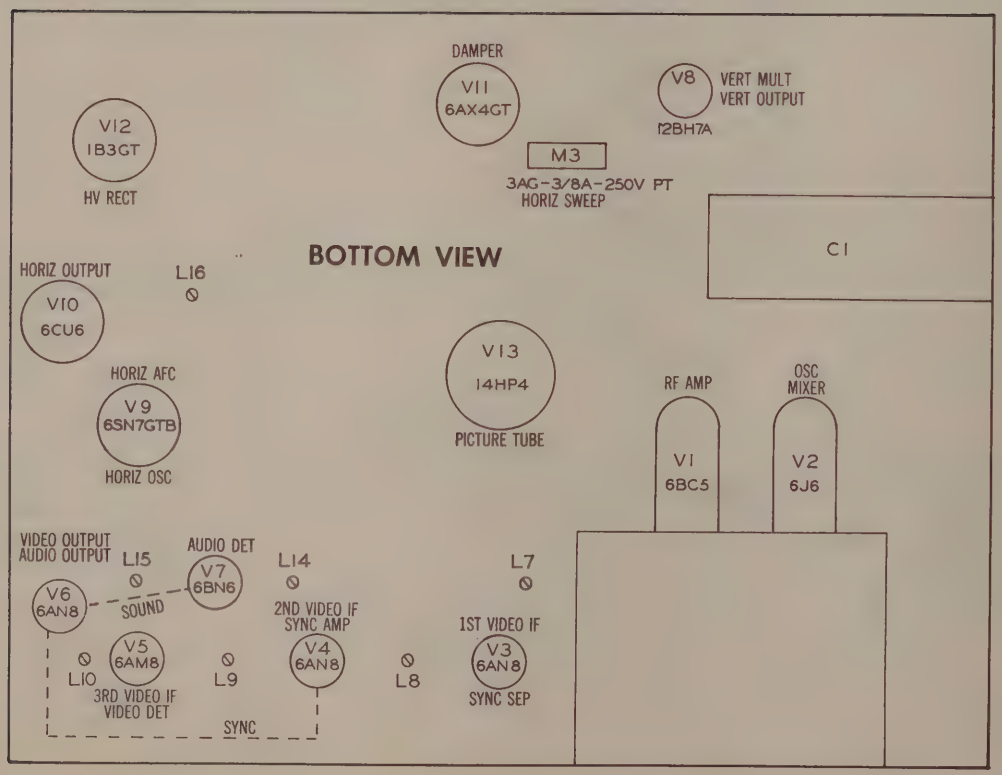
PROPERTY OF
L. F. BLANKENSHIP

OLYMPIC MODELS 14TD30, 14TD31, 14TD52, 14TD53
(Ch. AD), 17KE65, 17KE66, 17TE37, 17TE38 (Ch. AE)

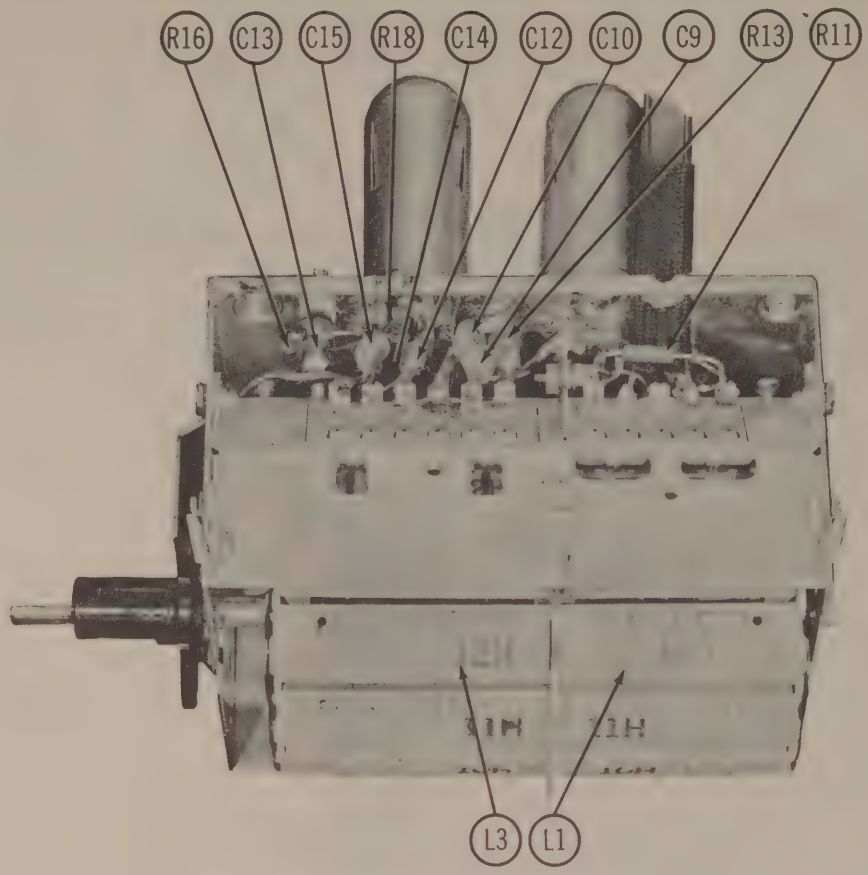
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	.1Ω	0Ω	†1KΩ	†3.2KΩ	0Ω		
V 2	6J6	†15KΩ	†15KΩ	.1Ω	0Ω	225KΩ	10KΩ	0Ω		
V 3	6AN8	†50KΩ	2.2Meg	0Ω	0Ω	.1Ω	†1KΩ	†1KΩ	1Meg	47Ω
V 4	6AN8	†28KΩ	130KΩ	0Ω	0Ω	.1Ω	†64Ω	†64Ω	1Meg	47Ω
V 5	6AM8	150Ω	.2Ω	†600Ω	.1Ω	0Ω	†600Ω	.2Ω	5.6KΩ	0Ω
V 6	6AN8	†1KΩ	■350KΩ	■1KΩ	.1Ω	0Ω	▲10KΩ	†64Ω	750KΩ	250Ω
V 7	6BN6	300Ω	7.5Ω	0Ω	.1Ω	†2.2KΩ	5.5Ω	▲230KΩ		
V 8	12BH7A	▲1.5Meg	1Meg	0Ω	.1Ω	.1Ω	▲6.2KΩ	■3.9Meg	■2.6KΩ	0Ω
V 9	6SN7GTB	■1.5Meg	†30KΩ	■400KΩ	■500KΩ	†50KΩ	■220Ω	.1Ω	0Ω	
V 10	6CU6	NC	0Ω	NC	†22KΩ	■1Meg	TP	.1Ω	■220Ω	TOP CAP ▲24Ω
V 11	6AX4GT	NC	NC	140KΩ	NC	†70Ω	NC	0Ω	.1Ω	
V 12	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲454Ω
V 13	14HP4	0Ω	160KΩ	PIN 6 64Ω	PIN 10 ▲26Ω	PIN 11 †450KΩ	PIN 12 .1Ω			

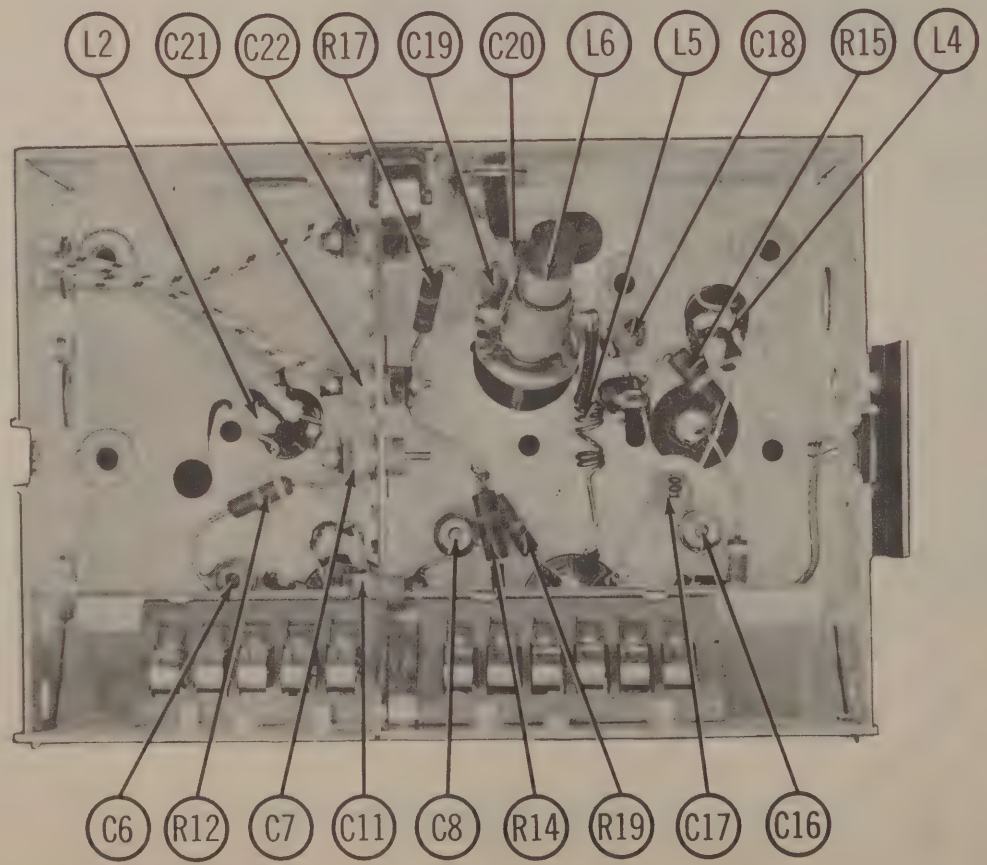
† MEASURED FROM POSITIVE SIDE OF M1.
■ MEASURED FROM NEGATIVE SIDE OF M2.
▲ MEASURED FROM PIN 3 OF V11.
NC - NO CONNECTION
TP - TIE POINT



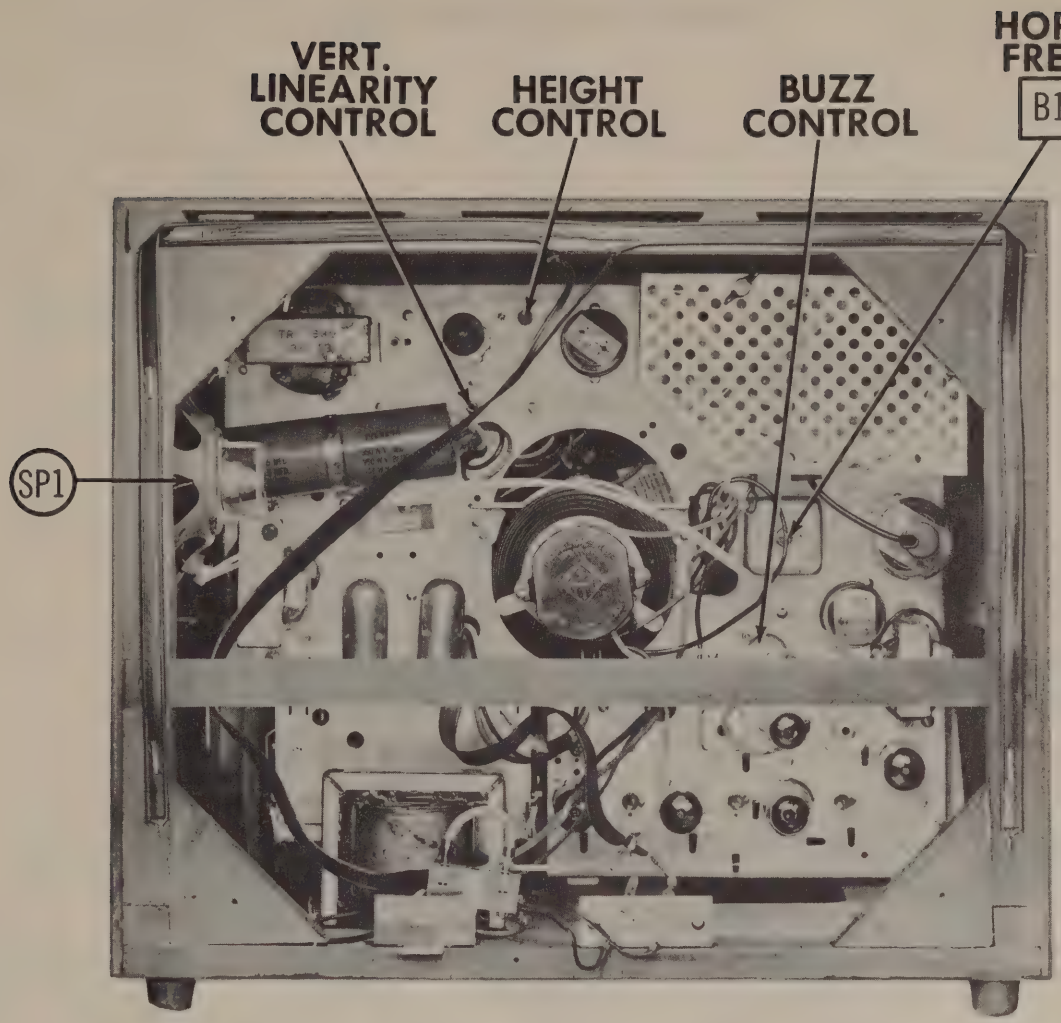
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



PROPERTY OF
L. F. BLANKENSHIP
3924 MEAD. ST.
DENVER, COLORADO

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Connect a short across terminal "C" and "D" of the horizontal oscillator coil (L16).

Set the horizontal hold control to fully clockwise position.

Adjust the horizontal frequency slug (B1) until the picture falls into sync.

Remove the short from L16 and connect the vertical amplifier input of an oscilloscope thru a 5MMF capacitor to terminal "C" of L16.

Adjust the horizontal phasing slug (B2) for a waveshape on scope as in Fig. 7 with broad and narrow peaks of equal height.

If necessary, during adjustment of B2 keep the picture in sync with B1 or the horizontal hold control.

Remove the scope from terminal "C" of L16 and retouch B1 for the following conditions.

1. At full clockwise position of the horizontal hold control a blanking bar or picture jitter should be evident.
2. At full counter clockwise position the picture should be out of sync with $4\frac{1}{2}$ to 5 bars sloping down to the left.

It may be necessary to momentarily interrupt the signal to throw the picture out of sync.

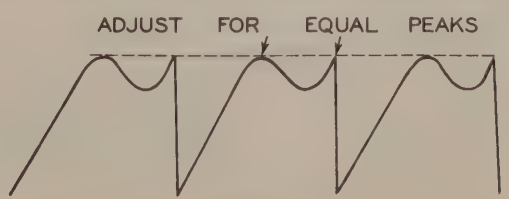


FIG. 7

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V10 and V11. Check M1 and M2. Check T2, T4A, R81, R85, C67, C68 and other associated components.

DRIVE LINES

Check by substitution V10 and V11. Check C67, C68, R81, T2, T4A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V10 and V11. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines."

PIE CRUST EFFECT

Check by substitution V9, V10 and V11. Check C60, C61, C62 for open. Check L16, R73, R4 and other associated components.

XMAS TREE EFFECT

Check by substitution V9, V10 and V11. Check T2 and T4 for internal arcing. Check L16, C63, C58, R74 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V8. Check waveform W6.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R65, R63, C1D, C56 and other associated components.	Check C53, C55, R6, R60, R59, R89 and other associated components.

INSUFFICIENT SWEEP

Substitute V8. Check height and vertical linearity controls for proper operation. Check R60, T3 and other associated components.

COMPRESSED AT BOTTOM

Substitute V8. Check R60, R6, C55 and other associated components.

COMPRESSED AT TOP

Substitute V8. Check R63, R7, C3C, C55, T3 and other associated components.

FOLDS

Substitute V8. Check C54, C55, R61, T3, T4B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V3 and V4. Check C48, C49, C50, R51, R54, R55 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V8. Check vertical integrator network. Check C52, C53, R59, R5 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Substitute V9. Check C57, C59, C64, L16, R73, R4 and other associated components.

HORIZONTAL BENDING

Check by substitution V3, V4 and V9. Check components associated with V9.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C37, C40, R39, R40 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check contrast control. Check L12, L13, C37, C40 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check video detector network. Check C37, C40 and other associated components.

SMEAR

Substitute V6. Check L11, L12, L13, C37, C40 and R39. Check video IF alignment and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7 and V6. Check stage V6 using audio signal generator. Apply audio signal across C45.

If Satisfactory	If Unsatisfactory
Check components associated with V7.	Check C45, C47, C46, C3B, R45, R44, R46, R47, T5, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A7 and R8 for minimum buzz.

DISTORTED

Follow procedure outlined under "Weak or no Sound."

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, check M1, M2 and R85. Check B+ filter and decoupling network.

SMALL AND/ON DIM PICTURE

Check M1, M2 and R85. Check B+ filter and decoupling network.

PR
L. F. E
SHIP
3924 MEADE ST.
DENVER, COLORADO

OLYMPIC MODELS 14TD30, 14TD31, 14TD52, 14TD53
(Ch. AD), 17KE65, 17KE66, 17TE37, 17TE38 (Ch. AE)

CHASSIS BOTTOM VIEW-INDUCTOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AN

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BC5	6BC5	7BD	
V2	Mixer-Osc.	6J6	6J6	7BF	
V3	1st. Video IF Amp.-Sync Separator	6AN8	6AN8	9DA	
V4	2nd. Video IF Amp.-Sync Amp.	6AN8	6AN8	9DA	
V5	3rd. Video IF Amp.-Video Det.	6AM8	6AM8	9CY	
V6	Video Output-Audio Output	6AN8	6AN8	9DA	
V7	Audio Detector	6BN6	6BN6	7DF	
V8	Vert. Mult.-Vert. Output	12BH7A	12BH7A	9A	
V9	Horiz. AFC-Horiz. Osc.	6SN7GTB	6SN7GTB	8BD	
V10	Horiz. Output	6CU6	6CU6	6AM	6BQ6GTA used as alternate
V11	Damper	6AX4GT	6AX4GT	4CG	
V12	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: OLYMPIC PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V13	14HP4 17HP4	17HP4/ 17RP4	14HP4 17HP4/ 17RP4	14HP4 17HP4/ 17RP4	14HP4 17HP4/17RP4	12L 12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	150	150	CO3620					D-095	
B	150	150						MTD-3520	
C	15	350							
D	15	350							
C2	150	150	CO3622			TC495	TD-150-150	MT-15150	
C3A	150	150	CO3621					D-100	
B	80	25						MT-15150	
C	100	50							
C4	220		CCD221M	DD-221	811-221	UC-5322		K-1322	
C5	220		CCD221M	DD-221	811-221	UC-5322		K-1322	
C6	3-9			829-10					
C7	800								
C8	.5-3			829-3	3115-01-0R5	CT565A			
C9	1000			DD-102	801-001	DC-521			
C10	220			DD-221	811-221	UC-5322			
C11	800								
C12	100			DD-101	801-001	DC-521			
C13	.5-3			829-3	3115-01-0R5	CT565A			
C14	10			TCZ-10	NP0K-100	ZT-541			
C15	2.2			TCZ-2R2	NP0A-2R2				
C16	.5-3			829-3	3115-01-0R5	CT565A			
C17	1000			DD-102	801-001	DC-521			
C18	10			TCZ-10	NP0K-100	ZT-541			
C19	47			TCZ-47	NP0-338-470	ZT-5447			
C20	120			DD-121	811-121	UC-5312			
C21	800								
C22	800								
C23	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C24	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C25	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C26	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C27	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C28	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C29	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C30	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C31	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C32	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C33	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C34	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C35	4.7		CO1083	TCZ-4R7	NP0A-4R7	ZT-555		KR-1550	
C36	.22	200	CO-H-2224			PT4022	IMP2-P22	3302022	
C37	.1	200	CO-H-2104	DF-104		PT401	IMP2-P1	330201	
C38	220		CCD221M	DD-221	811-221	UC-5322		K-1322	
C39	10000		CCD103X	DD-103	811-01	DC-511	IMP6-S1	330611	
C40	.1	400	CO-H-4104	DF-104		PT401	IMP4-P1	330401	
C41	.047	200	CO-H-2473	DF-503		PT4147	IMP2-S47	3302147	
C42	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C43	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C44	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C45	470		CCD471M	DD-471	831-471	UC-5347		K-1347	
C46	.1	400	CO-H-4104	DF-104		PT401	IMP4-P1	330401	
C47	2000		CCD202M	DD-202	811-002	DC-522	IMP6-D2	C-1220	
C48	.002	600	CO-H-6202	D6-202	GP2L-202	PT622	IMP6-D2	330622	
C49	330		CCD331M	DD-331	811-331	UC-5333		K-1333	
C50	.02	400	CO-H-4203	DF-203	817-02	PT412	IMP4-S2	330412	
C51A	2000					DC-522	IMP6-D2	C-1220	
B	5000		♦PC2435	♦PC-100	♦1405-01	DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C52	.0022	600	CO-O-6222	D6-222	GP2-333-222	PT6222	IMP6-D22	3306222	
C53	.01	600	CO-B-6103	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C54	.047	400	CO-H-4473	DF-503		PT4147	IMP4-S47	3304147	
C55	.1	600	CO-H-6104	DF-104		PT601	IMP6-P1	330601	
C56	.0022	600	CO-O-6222	D6-222	GP2-333-222	PT6222	IMP6-D22	3306222	
C57	47	500	RCM20C470K	D6-470	831-470	MCB225		KR-1447	
C58	82		CCD820K	D6-820	801-820			KR-1482	
C59	.047	400	CO-H-4473	DF-503		PT4147	IMP4-S47	3304147	

CAPACITOR

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	CENTRALAB PART No.	ERIE PART No.
C60	.02	400	CO-H-4203	DF-203	817-02
C61	.047	400	CO-H-4473	DF-503	
C62	.47	200	CO-H-2474		
C63	180	1000	SCM40C181K	DD-181	
C64	.01	600	CO-B-6103	D6-103	GP2-333-1
C65	82		CCD820K	D6-820	801-820
C66	.001	600	CO-O-6102K		
C67	470		CCD471M	DD-471	831-471
C68	100	500		D6-101	801-101
C69	.047	200	CO-H-2473	DF-503	
C70	.1	400	CO-H-4104	DF-104	
C71	47	3000	CO3625	DD30-470	3KV-470
C72	56	2000		DD30-560	3KV-560
C73	.01	600	CO-B-6103	D6-103	GP2-333-1

Note 1. Not used in early production of models 14TD30, 14T
Note 2. Some versions use 47MMF in this application (part
Note 3. Not used in some versions.
♦ Items C51A, C51B, C51C, R57A, R57B, R57C are combi

CONT

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT: OLYMPIC PART No.	IRC PART No.	CLAROST PART N
R1A	500KΩ	½	PT3615	QI3-133	A47-500
B	Shaft		Not Req.	Not Req.	KSS-3
C	Switch		Not Req.	76-1	SWE-12
R2A	1500Ω	½	PT3618	QI7-109	
B	Shaft		Not Req.	Not Req.	
R3A	1Meg	½	PT3616	QII-137	A47-1Me
B	Shaft		Not Req.	Not Req.	KSS-3
R4A	50KΩ	½	PT3617	QII-123	A47-50K
B	Shaft		Not Req.	Not Req.	KSS-3
R5A	1Meg	½	PT3616	QII-137	A47-1Me
B	Shaft		Not Req.	Not Req.	KSS-3
R6A	1Meg	½	PT3636	QII-137	A47-1Me
B	Shaft		Not Req.	SQ	FKS-1/4
R7A	5000Ω	½	PT3619	QII-114	A47-5000
B	Shaft		Not Req.	SQ	FKS-1/4
R8	400Ω	2	PT3611		39-500

RESIS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	NOTES
R9	470KΩ	½	REB474M	BTS-470K	
R10	470KΩ	½	REB474M	BTS-470K	
R11	15KΩ	½		BTS-15K	
R12	47KΩ	½		BTS-47K	
R13	2200Ω	½		BTS-2200	
R14	1000Ω	½		BTS-1000	
R15	220KΩ	½		BTS-220K	
R16	4700Ω	½		BTS-4700	
R17	15KΩ	½		BTS-15K	
R18	10KΩ	½		BTS-10K	
R19	15KΩ	½		BTS-15K	
R20	1000Ω	½	REB102M	BTS-1000	
R21	2200Ω	½	REB222K	BTS-2200	
R22	1000Ω	½	REB102M	BTS-1000	
R23	47Ω	½	REB470M	BTS-47	
R24	8200Ω	½	REB822K	BTS-8200	
R25	1000Ω	½	REB102M	BTS-1000	
R26	47Ω	½	REB470M	BTS-47	
R27	8200Ω	½	REB822K	BTS-8200	
R28	150Ω	½	REB151K	BTS-150	
R29	560Ω	½	REB561M	BTS-560	
R30	15KΩ	½	REB153K	BTS-15K	
R31	5600Ω	½	REB562K	BTS-5600	
R32	1Meg	½	REB105M	BTS-1Meg	
R33	330Ω	½	REB331M	BTS-330	
R34	1.5Meg	½	REB155M	BTS-1.5Meg	
R35	1.5Meg	½	REB155M	BTS-1.5Meg	
R36	1500Ω	½	REB152M	BTS-1500	Note 1
R37	68Ω	½	REB680M	BTS-68	
R38	33KΩ	½	REB333M	BTS-33K	
R39	6800Ω	2	RED682M	BTB-6800	
R40	3300Ω	1	REC332M	BTA-3300	
R41	10KΩ	½	REB103M	BTS-10K	
R42	150KΩ	½	REB154M	BTS-150K	
R43	220KΩ	½	REB224M	BTS-220K	
R44	2200Ω	½	REB222M	BTS-2200	
R45	1000Ω	½	REB102M	BTS-1000	
R46	180KΩ	½	REB184M	BTS-180K	
R47	47KΩ	½	REB473M	BTS-47K	
R48	1000Ω	½	REB102M	BTS-1000	
R49	470KΩ	½	REB474M	BTS-470K	

♦ Items R57A, R57B, R57C, C51A, C51B and C
Note 1. Not used in early production models 14
Models 14TD30, 14TD31 and 17TE38 use a 150
Note 2. When R79 is not used, R78 is 47KΩ.
Note 3. Early production models 14TD30, 14T
Note 4. Models 14TD30 and 14TD31 use a 4.7Ω
Note 5. Used in models 14TD30 and 14TD31 onl
Note 6. Not used in some versions.

PROPERTY OF
C. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: OLYMPIC PART No	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BC8	6BC8	7BD	
V2	Mixer-Osc.	6J8	6J8	7BF	
V3	1st. Video IF Amp., Sync Separator	6AN8	6AN8	8DA	
V4	2nd. Video IF Amp., Sync Amp.	6AN8	6AN8	8DA	
V5	3rd. Video IF Amp., Video Det.	6AM8	6AM8	9CT	
V6	Video Output-Audio Output	6AN8	6AN8	8DA	
V7	Audio Detector	6BN6	6BN6	7DF	
V8	Vert. Mult.-Vert. Output	12BH7A	12BH7A	8A	
V9	Horiz. AFC-Horiz. Osc.	6SN7GTB	6SN7GTB	8BD	
V10	Horiz. Output	6CU8	6CU8	8AM	6BQ6GTA used as alternate
V11	Damper	6AX4GT	6AX4GT	6CG	
V12	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: OLYMPIC PART No	CBS	GENERAL ELECTRIC	SYLVANIA	WESTINGHOUSE	RETMA BASE TYPE	NOTES
V13	14EP4 17HP4	17RP4/ 17RP4	14EP4 17HP4/ 17RP4	14EP4 17KP4/ 17RP4	14EP4 17HP4/17RP4	12L 12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	150	150	CO3620					D-095	
B	150	150						MTD-2330	
C	15	350							
D	15	350							
C2	150	150	CO3632			TC496	TD-150-150	MT-15150	
C3A	150	150	CO3631					D-100	
B	90	25						MT-15150	
C	100	50							
C4	220		CCD221M	DD-221	811-221	UC-5223		K-1222	
C5	220		CCD221M	DD-221	811-221	UC-5222		K-1222	
C6	3-9			629-10					
C7	300								
C8	.5-3			629-3	3115-01-CR5	CT565A			
C9	1000			DD-102	801-001	DC-531			
C10	220			DD-221	811-221	DC-5223			
C11	500								
C12	100			DD-101	801-001	DC-521			
C13	.5-3			629-3	3115-01-CR5	CT565A			
C14	10			TCZ-10	MP0K-100	ET-541			
C15	3.3			TCZ-3R3	MP0A-3R3				
C16	.5-3			629-3	3115-01-CR5	CT565A			
C17	100			DD-101	801-001	DC-531			
C18	10			TCZ-10	MP0K-100	ET-541			
C19	47			TCZ-47	MP0-338-47G	ET-5447			
C20	220			DD-221	811-221	UC-5313			
C21	500								
C22	500								
C23	5000		CCD502X	DD-502	811-005	DC-535		C-1250	
C24	5000		CCD502X	DD-502	811-005	DC-535		C-1250	
C25	5000		CCD502X	DD-502	811-005	DC-535		C-1250	
C26	5000		CCD502X	DD-502	811-005	DC-535		C-1250	
C27	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C28	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C29	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C30	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C31	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C32	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C33	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C34	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C35	4.7		CD0S4S	TCZ-4R7	MP0A-4R7			RM-1850	
C36	.33	300	CO-H-2334			PT4023	IMP2-P33	3303032	
C37	.1	300	CO-H-2104	DF-104		PT401	IMP2-P1	330201	
C38	330		CCD331M	DD-331	811-331	UC-5333		K-1333	
C39	10000		CCD103X	DD-103	811-01	DC-511	IMP8-S1	330611	
C40	.1	400	CO-H-4104	DF-104		PT401	IMP4-P1	330401	
C41	.047	300	CO-H-2473	DF-503		PT4147	IMP2-S47	3303147	
C42	1500		CCD152X	DD-152	801-0015	DC-5215		C-1215	
C43	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C44	5000		CCD502X	DD-502	811-005	DC-525		C-1250	
C45	470		CCD471M	DD-471	831-471	MC5347		K-1347	
C46	.1	400	CO-H-4104	DF-104		PT401	IMP4-P1	330401	
C47	3000		CCD302M	DD-302	811-003	DC-523	IMP6-D8	C-1230	
C48	.003	600	CO-H-6S2S	DS-202	G21L-202	PT622	IMP6-D2	3306223	
C49	330		CCD331M	DD-331	811-331	UC-5333		K-1333	
C50	.02	400	CO-H-4303	DF-203	811-02	PT403	IMP4-S3	330412	
C51A	2000					DC-523	IMP6-D5	C-1250	
B	5000		+PC2435	+PC-100	+1405-01	DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C52	.0022	600	CO-O-6222	D6-222	GP2-S33-223	PT6223	IMP6-D22	3306223	
C53	.01	600	CO-H-6103	D6-103	GP2-S33-103	PT611	IMP6-S1	330611	
C54	.047	400	CO-H-4473	DF-503		PT4147	IMP4-S47	3304147	
C55	.1	600	CO-H-6104	DF-104		PT601	IMP6-S1	330601	
C56	.0022	600	CO-O-6222	D6-222	GP2-S33-222	PT6223	IMP6-D22	3306222	
C57	47	500	RCM39C470K	D6-470	831-470	MC3S26		KR-1447	
C58	82		CD0S2K	D6-S20	801-S20			KR-1482	
C59	.047	400	CO-H-4473	DF-503		PT4147	IMP4-S47	3304147	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OLYMPIC PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C60	.02	400	CO-H-4203	DF-203	811-02	PT413	IMP4-S2	330413	
C61	.047	400	CO-H-4473	DF-503		PT4147	IMP4-S47	3304147	
C62	.47	200	CO-H-3474			PT4047	IMP2-S47	3302047	
C63	180	1000	SCM40C181K	DD-181					
C64	.01	600	CO-H-6103	D6-103	GP2-S33-103	PT611	IMP6-S1	330611	
C65	82		CCD82K	D6-S20	801-S20			KR-1482	
C66	.001	600	CO-O-6102K			MC3S55		KR-1310	
C67	470		CCD471M	DD-471	831-471	UC-5347		K-1347	
C68	100	500		DD-101	801-101	MC3S26		KR-1310	Note 3
C69	.047	300	CO-H-3473	DF-503		PT4147	IMP2-S47	3302147	
C70	.1	400	CO-H-4104	DF-104		PT401	IMP4-P1	330401	
C71	47	3000	CO8S25		43C-470	DC30447		K-4447	Note 1
C72	56	3000		DD30-560	43C-560	DC30456			Note 2
C73	51	600	CO-B-5103	D8-103	GP2-S33-103	PT511	IMP8-S1	330611	

Note 1. Not used in early production of models 14TD30, 14TD31 and 17TE38
Note 2. Some versions use 47MMF in this application (part #CO3625).
Note 3. Not used in some versions.
* Items C5A1, C5A2, C5C, R57A, R57B, R57C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OLYMPIC PART No	IRC PART No	CLAROSTAT PART No	CENTRALAB PART No	MALLORY PART No	INSTALLATION NOTES
R1A	500KΩ	½	PT3615	Q13-133	A47-500K-Z	AB-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	Y6-1	SWE-12	KS-1	U6-36	Attach to R1A
R2A	1500Ω	½	PT3618	Q1Y-109		AB-S15	U-5	Contrast
B	Shaft		Not Req.	Not Req.		AK-4	Not Req.	Attach to R2A
R3A	1Meg	½	PT3616	Q1U-137	A47-1Meg-S	AB-69	U-54	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
R4A	50KΩ	½	PT3617	Q1U-133	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	1Meg	½	PT3616	Q1U-137	A47-1Meg-S	AB-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R5A
R6A	1Meg	½	PT3636	Q1U-137	A47-1Meg-S	HK-69	SU-54	Vert. Height
B	Shaft		Not Req.	8Q	FKS-1/4	AK-4	Not Req.	Attach to R6A
R7A	5000Ω	½	PT3610	Q1J-114	A47-5000-S	AB-10	SU-16	Vert. Linearity
B	Shaft		Not Req.	8Q	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8	400Ω	2	PT39U1		2B-400			Brass

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATTS	REPLACEMENT DATA: OLYMPIC PART No.	IRC PART No.	NOTES
R9	470KΩ	½	REB474M	BTS-470K	
R10	470KΩ	½	REB474M	BTS-470K	
R11	15KΩ	½		BTS-15K	
R12	47KΩ	½		BTS-47K	
R13	220Ω	½		BTS-220	
R14	1000Ω	½		BTS-1000	
R15	220KΩ	½		BTS-220K	
R16	4700Ω	½		BTS-4700	
R17	15KΩ	½		BTS-15K	
R18	10KΩ	½		BTS-10K	
R19	15KΩ	½		BTS-15K	
R20	1000Ω	½	REB102M	BTS-1000	
R21	2200Ω	½	REB222K	BTS-2200	
R22	10000Ω	½	RET8103M	BTS-10000	
R23	47Ω	½	REB470M	BTS-47	
R24	8200Ω	½	REB822K	BTS-8200	
R25	1000Ω	½	REB102M	BTS-1000	
R26	47Ω	½	REB470M	BTS-47	
R27	8200Ω	½	REB822K	BTS-8200	
R28	150Ω	½	REB151K	BTS-150	
R29	560Ω	½	REB561M	BTS-560	
R30	15KΩ	½	REB153K	BTS-15K	
R31	5600Ω	½	REB562K	BTS-5600	
R32	1Meg	½	REB105M	BTS-1Meg	
R33	330Ω	½	REB331M	BTS-330	
R34	1.5Meg	½	REB155M	BTS-1.5Meg	
R35	1.5Meg	½	REB155M	BTS-1.5Meg	
R36	1500Ω	½	REB152M	BTS-1500	Note 1
R37	68Ω	½	REB680M	BTS-68	
R38	33KΩ	½	REB333M	BTS-33K	
R39	6800Ω	½	REB682M	BTS-6800	Note 2
R40	3300Ω	1	RC332M	BTA-3300	Note 2
R41	10KΩ	½	REB103M	BTS-10K	
R42	150KΩ	½	REB154M	BTS-150K	
R43	220KΩ	½	REB224M	BTS-220K	
R44	2200Ω	½	REB222M	BTS-2200	
R45	1000Ω	½	REB102M	BTS-1000	
R46	180KΩ	½	REB184M	BTS-180K	
R47	47KΩ	½	RE3473M	BTS-47K	
R48	1000Ω	½	REB102M	BTS-1000	
R49	470KΩ	½	REB474M	BTS-470K	
R50	2.2Meg	½	REB225M	BTS-2.2Meg	
R51	82KΩ	½	REB823K	BTS-82K	
R52	82KΩ	½	REB823K	BTS-82K	
R53	82KΩ	½	REB823K	BTS-82K	
R54	22KΩ	½	REB223M	BTS-22K	
R55	5600Ω	½	REB562M	BTS-5600	
R56	47KΩ	½	REB473M	BTS-47K	
R57A	22KΩ	½		BTS-22K	
B	8200Ω		*PC2435	BTS-8200	
C	8200Ω			BTS-8200	
R58	47KΩ	½	RRB473M	BTS-47K	
R59	470KΩ	½	REB474M	BTS-470K	
R60	1Meg	½	REB105M	BTS-1Meg	
R61	8200Ω	½	REB822K	BTS-8200	
R62	3.9Meg	½	REB395M	BTS-3.9Meg	
R63	560Ω	½	REB561M	BTS-560	
R64	100KΩ	½	REB104K	BTS-100K	
R65	47000Ω	½	RED473M	BTS-47000	
R66	560Ω	½	REB561M	BTS-560	
R67	560Ω	½	REB561M	BTS-560	
R68	330KΩ	½	REB334K	BTS-330K	
R69	82KΩ 5%	1	RRC823J	BTA-82K 5%	
R70	820KΩ	1	RRC824K	BTA-820K	
R71	330KΩ 5%	1	RRC334K	BTA-330K 5%	
R72	3900Ω	½	REB392K	BTS-3900	
R73	22KΩ	½	REB223M	BTS-22K	
R74	150KΩ 5%	1	RRC154J	BTA-150K 5%	
R75	82000Ω	½	REB823K	BTS-82000	
R76	22KΩ	½	REB223K	BTS-22K	
R77	150KΩ	½	REB154K	BTS-150K	
R78	100KΩ	½		BTS-100K	Note 2
R79	100KΩ	½		BTS-100K	Note 2
R80	1Meg	½	REB105M	BTS-1Meg	
R81	22KΩ	5	RED223K	BTB-22K	Note 3
R82	1000Ω	2	REJ102M	BTS-1000	Note 1
R83	3.3Ω	5	RE3R3M		
R84	220Ω	5	RE3224	PWF-220	
R85	7.5Ω	5	RE3R3		Note 4
R86	470KΩ	½	REB474M	BTS-470K	
R87	10Meg			BTS-10Meg	Note 5
R88	2.2Meg			BTS-2.2Meg	Note 5
R89	220KΩ				Note 6

* Items R57A, R57B, R57C, C5A1, C5A2 and C5C are combined in one unit.
Note 1. Not used in early production models 14TD30, 14TD31, 17TE38.
Models 14TD30, 14TD31 and 17TE38 use a 1500 resistor in this application.
Note 2. When R79 is not used, R78 is 47KΩ.
Note 3. Early production models 14TD30, 14TD31 and 17TE38 use a 12KΩ, 2 watt resistor in this application.
Note 4. Models 14TD30 and 14TD31 use a 4.7Ω resistor in this application.
Note 5. Used in models 14TD30 and 14TD31 only.
Note 6. Not used in some versions.

TRANSFORMER (FILAMENT)

ITEM No	RATING	REPLACEMENT DATA: OLYMPIC PART No	Halldorson PART No	Merit PART No.	RCA TYPE No	Stancor PART No	Thordarson PART No	Triad PART No
	PRI	SEC 1	SEC 7						
T1	117VAC ④ 6.6A tap ⑤ 6.3VAC ⑥ 6.8A	TR-3662		P-3947 ①③				

① Drill new mounting holes.
② Tape 6.3V center tap.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Horiz. Output Trans.	TR3597-1 TR3597-2 ①	FD420 *			A-8254 *	FLY-75 *	D-49 *②
T3	Vert. Output Trans.	TR3589 TR3659 ③	Z1806②④	Z2671②④	V312②④	A-8141②④	Z6854 ②④	A-104X ②
T4A B	Yoke-Horiz. (SMMD Vert. (STMH)	CL3596	DF606 ⑤	MDF-73 ⑤	Z2ZD1⑤	T70P18/43 ①	DY-11A ⑤	Y-9 ⑤	Y-33-1 ⑤

① Alternate horizontal output transformer.
② Drill new mounting hole(s).
③ Alternate vertical output transformer.
④ Connect blue lead to plate (pin #6 of V6B). Connect red lead of transformer to yellow lead of yoke and also to junction R66 and C1D (B+). Remove black lead of yoke from ground and connect to green lead of transformer.
⑤ Connect horizontal yoke damping network across terminals #3 and #7. Use original network if necessary.
⑥ Remove capacitor from terminals #1 and #2. Use original horizontal yoke damping network if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5			5	5	4
4	2		4	4	2	
3	1		3	3	3	1
2(NC)	NC		NC	NC	NC	
1 (NC)	NC		NC	NC	NC	

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE	REPLACEMENT DATA: OLYMPIC PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
	PRI. SEC.							
T5	11.5KΩ 3.5Ω	TR-3661	Z1117	A-3823	A-3856	54S80	S-51X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: OLYMPIC PART No.	QUAM PART No.	NOTES
SP1	5"	PM	3.5Ω	SK1768-3 SK1768-1 ①	5A0T	① Alternate PM speaker

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI	DC RES. SEC	REPLACEMENT DATA: OLYMPIC PART No	MEISSNER PART No.	MERIT PART No	MILLER PART No	NOTES
L1	Ant. Coils	0Ω CT	0Ω					
L2	Fil. Choke	0Ω						
L3	RF, Mixer Grid & Osc. Coils	0Ω		CL1471	17-1003	TV-102 *	6171 *	
L4	Fil. Choke	0Ω		CL2659	17-1052	TV-116	6250	
L5	RF Coil	0Ω		CL2659	17-1053	TV-116	6249	
L6	Conv. Plate	.75Ω		CL2659	17-1063	TV-116 *	6249	
L7	1st. Video IF	.2Ω	.2Ω	CL3659	17-1063	TV-116	6249	
L8	2nd. Video IF	.2Ω	.2Ω					
L9	3rd. Video IF	.2Ω	.2Ω					
L10	4th. Video IF	.2Ω	.2Ω	CL3659	17-1063	TV-116	6249	
L11	Series Peaking Coil	2.5Ω		CL1535	19-3036	TV-180	6176	36 Microhenries
L12	Series Peaking Coil	7Ω		CL2073	19-3250 ■	TV-185 ■	6181 ■	250 Microhenries, wound on 1Meg resistor
L13	Shunt Peaking Coil	8Ω		CL3405	19-3306 ■	TV-180 ■	6186 ■	300 Microhenries, wound on 1Meg resistor
L14	Sound IF	7.9Ω		CL3414	17-3496 ▲	TV-113 ▲	6303 ▲	
L15	Quadrature Coil	5.5Ω		CL2803	17-3495 ▲	TV-113▲	1487	
L16	Horiz. Osc.	21Ω	53Ω	TR2990	20-1402	TV-162	6183	Waveform winding -43Ω

* Enlarge mounting hole.
■ Parallel with 1Meg resistor.
▲ Use one winding only and add 5MMF capacitor externally.
= Use one winding only.

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L17	.180ADC	64Ω	2 HY	CK1346	C5026	C-2974	C-2325 ①	26C43 ①	C-21X

① Drill one new mounting hole.

SELENIUM RECTIFIER

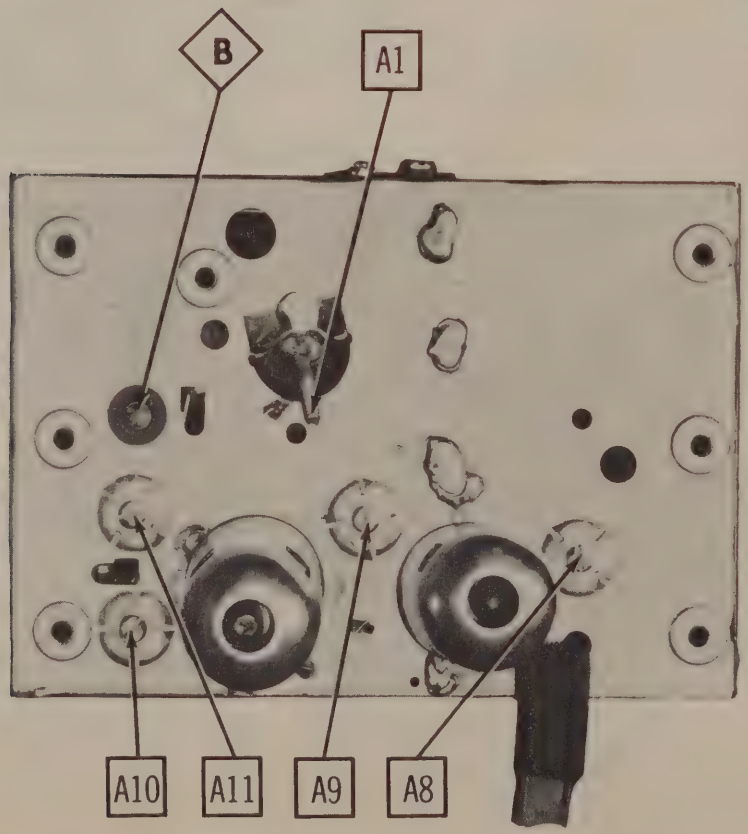
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	OLYMPIC PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.180ADC	RF3613	1236A	MR-300	6S300	6Q4	300	
M2	.110ADC	RF3613	1236A	MR-300	6S300	6Q4	300	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			OLYMPIC PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG P/T	3/8A 250V	FU3492		318.375 (3AG P/T 3/8A)		GJV 3/8	

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M4	Tuner	CL3612	VHF - Chassis AD
	Tuner	CL3612-17	VHF - Chassis AE
M5	Centering Device	PP2763	
M6	Ion Trap	PP2623	
	Cabinet	CA3560	Models 14TD30, 14TD31, 14TD52, 14TD53
	Cabinet	CA3692	Models 17TE37, 17TE38, 17KE65, 17KE66
	Knob	KN3369	Channel Selector
	Knob	KN3670	Fine tuning - Models 14TD30, 14TD31, 14TD52, 14TD53
	Knob	KN3771	Fine tuning - Models 17TE37, 17TE38, 17KE65, 17KE66
	Knob	KN3671	Control Panel - 5 used
	Safety Glass	PP3564	Models 14TD30, 14TD31, 14TD52, 14TD53
	Safety Glass	PP3648	Models 17TE37, 17TE38, 17KE65, 17KE66
	Mask	PP3565	Models 14TD30, 14TD31, 14TD52, 14TD53
	Mask	PP3647	Models 17TE37, 17TE38, 17KE65, 17KE66



RF TUNER TOP VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V9, V10, V11 and V12. Check fuse, M3. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C69, C70, C71, C72, R81 and other associated components.	Check L16, C59, C63, C64, C67, R73, R78, R79, R76, R75, and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V10 and V11. Check M1 and M2. Check T2, R81, R85, C67 and other associated components.

BLOOMING

Check by substitution V10, V11 and V12. Check M1 and M2. Check R85, R81, C67, C66 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

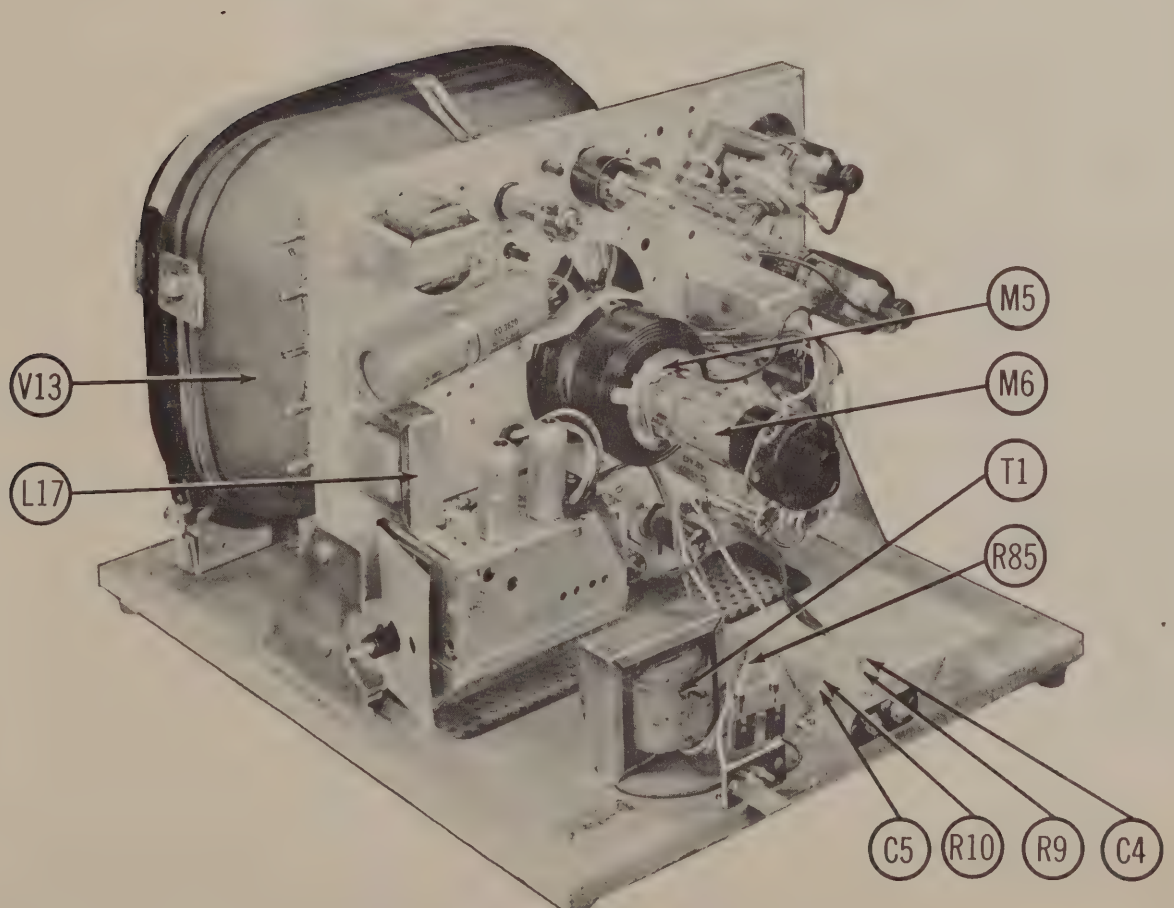
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS—REAR VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding wood strip at the top of the safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on top of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L16) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the set. Adjust the buzz control (R8) for maximum volume and minimum buzz.

FUSES

One fuse is used for horizontal and vertical sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL (AE CHASSIS)

1. Remove 7 push-on type control knobs from side panel of cabinet.
2. Remove 5 wood screws. Remove rear cover.
3. Remove 2 wood screws. Remove wooden cross-bar at the rear of cabinet.
4. Remove speaker leads.
5. Remove 4 flat-head phillips screws (2 on each side of cabinet bottom) and 2 large hex-head screws at the rear edge of cabinet bottom which protrude thru the angle brackets on each side. (CAUTION : Do not remove any other hex-head screws other than the 2 which protrude thru the angle bracket.
6. Tilt cabinet forward and lift cabinet off of chassis mounting board.
7. Remove 2 speaker nuts. Remove speaker.

CABINET REMOVAL (AD CHASSIS)

1. Remove 7 push-on type control knobs from side panel of cabinet.
2. Remove 5 wood screws. Remove rear cover.
3. Remove speaker leads.
4. Remove 7 large flat-head phillips screws around the edges of the cabinet bottom (Do not remove any hex-head screws from cabinet bottom).
5. Tilt cabinet forward and lift cabinet off of chassis mounting board.
6. Remove 2 speaker nuts. Remove speaker.

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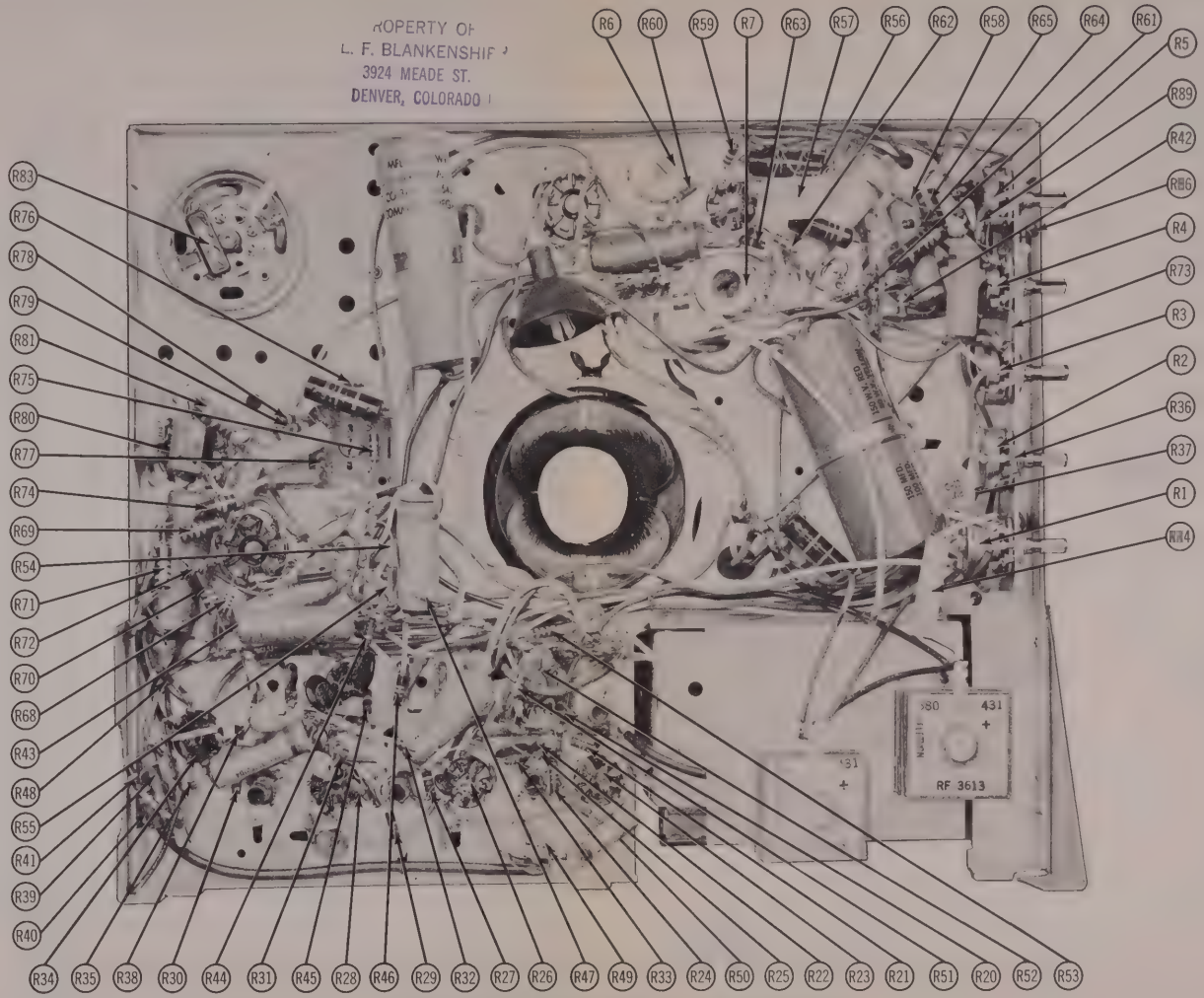

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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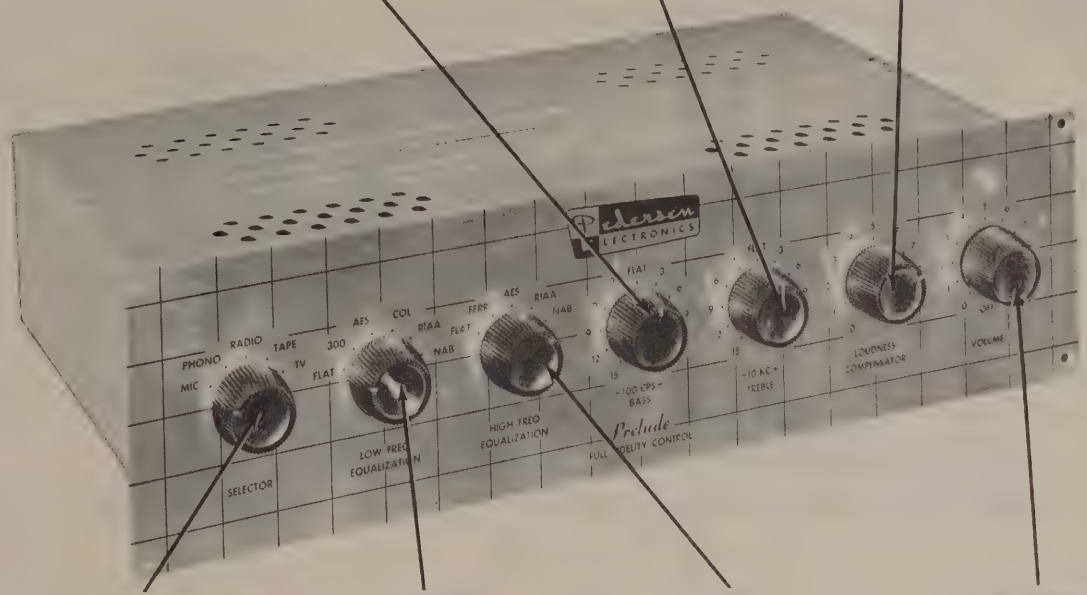
PEDERSEN MODEL
PRT-1B, PRT-1LC



PEDERSEN MODEL
PRT-1B, PRT-1LC

TRADE NAME	Pedersen Models PRT-1B, PRT-1LC
MANUFACTURER	Pedersen Electronics, P. O. Box 572, Lafayette, Calif.
TYPE SET	AC Operated 5 Channel Audio Preamplifier & Equalizer
TUBES (Six)	Types 12AX7 Preamp., (3) 12AX7 AF Amp., 12AX7 Cathode Follower, 6X4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.25 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PEDERSEN PART No.	STANDARD REPLACEMENT		
V1	Preamp.	12AX7	12AX7	9A	
V2	AF Amp.	12AX7	12AX7	9A	
V3	AF Amp.	12AX7	12AX7	9A	
V4	AF Amp.	12AX7	12AX7	9A	
V5	Cathode Follower	12AX7	12AX7	9A	
V6	Rectifier	6X4	6X4	5BS	

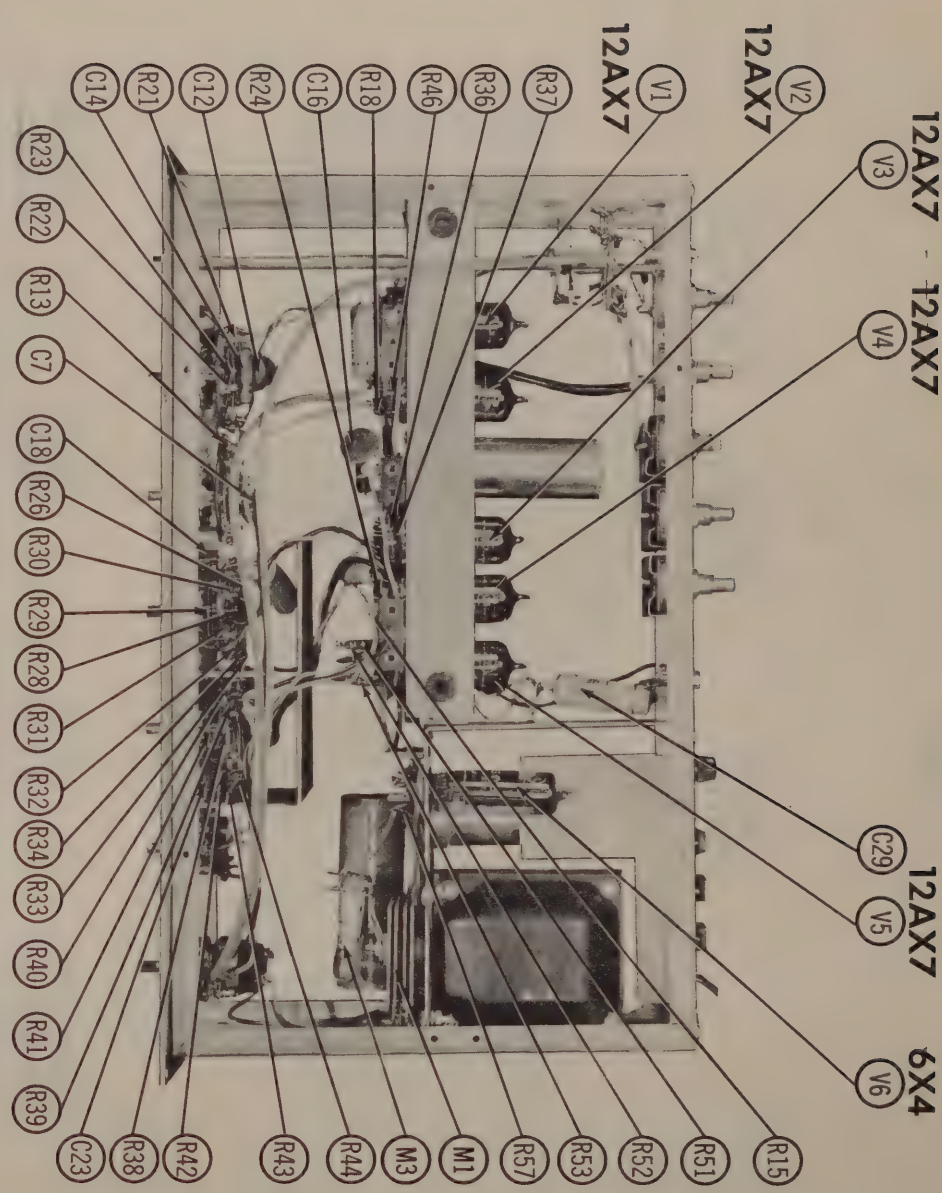
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	PEDERSEN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲20	450				FP234	TM-D20-450	D-215	
B	■20	450							
C2A	■20	350					TM-D20-350	D-160	
B	20	350					TD-20-350	MT-3516	
C	▲20	350							
C3	2000	12				TD-1000-15		S-025	
						TD-1000-15			
C4	1200			D6-122	GP2L-122	UC-5212		C-1212	
C5	820			D6-821	GP2L-821			K-1382	
C6	700							K-1370	
C7	180			D6-181	GP2K-181			K-1318	
C8	10000			DD-103	811-01	DC511			
C9	.1	400		DF-104		PT401	IMP4-P1	330401	
C10	2000			DD-202	801-002	DC522		C-1220	
C11	3000			DD-302	811-003	UC-523		C-1230	
C12	3000			DD-302	811-003	UC-523		C-1230	
C13	5000			DD-502	811-005	DC525		C-1250	
C14	6800			D6-682	GP3-333-682				
C15	.05	400		DF-503		PT415	IMP4-S5	330415	
C16	10000			DD-103	811-01	DC511			
C17	.1	400		DF-104		PT401	IMP4-P1	330401	
C18	1500			DD-152	801-0015	UC5215		C-1215	
C19	.008	400				PT1628	CT16-D8	330628	Note 1
C20	33			DD-330	831-330	UC-5433		K-1433	Note 2
C21	33			DD-330	831-330	UC-5433		K-1433	
C22	.1	400		DF-104		PT401	IMP4-P1	330401	
C23	75			D6-750	GP1K-750	UC-5475		K-1475	
C24	1000			DD-102	801-001	DC521		K-1210	
C25	.05	400		DF-503		PT415	IMP4-S5	330415	
C26A	200								
B	100								
C	4500								
D	4500								
C27	10000			DD-103	811-01	DC511			
C28	.1	400		DD-104		PT401	IMP4-P1	330401	
C29	.1	400		DD-104		PT401	IMP4-P1	330401	
C30	10000			DD-103	811-01	DC511			
C31	10000			DD-103	811-01	DC511			

Note 1. Some versions may use a .01 MFD capacitor in this application.
Note 2. C20 omitted in late production models.
♦ Items C26A, C26B, C26C, C26D, R49A, and R49B are included with volume control.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PEDERSEN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	500KΩ	½	28-510			C1-60		Loudness (Tapped a 300K and 275KΩ) See Note L
R2A	500KΩ	½	28-507	Q11-133			UF56L	Volume
B	500KΩ	½		M11-133			UR55L	Attach to R2A
C	Shaft						D8-38	Attach to R2A and R2B
D	Switch			76-1			U8-36	Attach to R2B
R3A	500KΩ	½	28-506	Q13-133	A47-500K-Z	B-60	U-46	T. V. Input
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R3A
R4A	500KΩ	½	28-508	Q13-133	A47-500K-Z	B-60	U-46	Tape Input
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R4A
R5A	500KΩ	½	28-505	Q13-133	A47-500K-Z	B-60	U-46	Radio Input
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R5A
R6A	500KΩ	½	28-506	Q13-133	A47-500K-Z	B-60	U-46	Phono Input
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R6A
R7A	500KΩ	½	28-504	Q13-133	A47-500K-Z	B-60	U-46	Microphone Input
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R7A

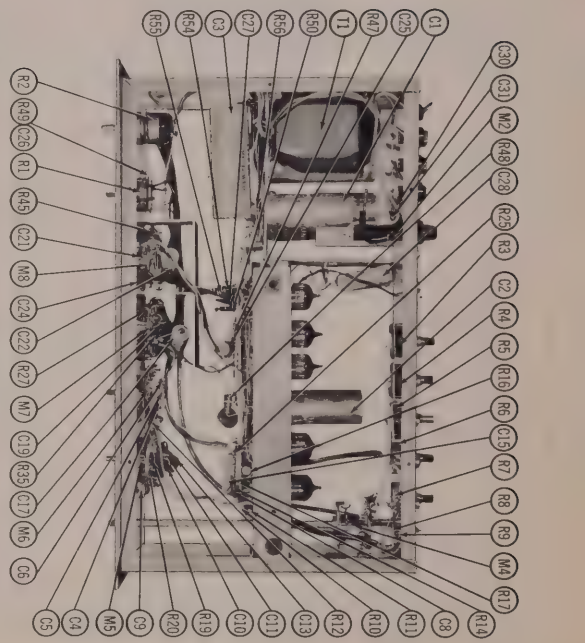
Note L. Loudness control includes R49A, R49B, C28A, C28B, C28C, and C28D.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PEDERSEN PART No.	IRC PART No.	
R6	47KΩ	½		BTS-47K	
R9	12KΩ	½		BTS-12K	
R10	47KΩ	½		BTS-47K	
R11	2200Ω	½		BTB-2200	
R12	100KΩ	½		BTS-100K	
R13	10KΩ	½		BTS-10K	
R14	100KΩ	½		BTS-100K	
R15	1Meg	½		BTS-1Meg	
R16	1000Ω	1		BTA-1000	
R17	100KΩ	½		BTS-100K	
R18	33KΩ	½		BTS-33K	
R19	2. 2Meg	½		BTS-2. 2Meg	
R20	1. 5Meg	½		BTS-1. 5Meg	
R21	560KΩ	½		BTS-560K	
R22	10Meg	½		BTS-10Meg	
R23	10Meg	½		BTS-10Meg	
R24	820Ω	1		BTA-820	
R25	47KΩ	½		BTS-47K	
R26	1MegΩ	½		BTS-1Meg	
R27	220KΩ	½		BTS-220K	
R28	18KΩ	½		BTS-18K	
R29	220KΩ	½		BTS-220K	
R30	18KΩ	½		BTS-18K	
R31	47KΩ	½		BTS-47K	
R33	47KΩ	½		BTS-47K	
R33	100KΩ	½		BTS-100K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PEDERSEN PART No.	IRC PART No.	
R34	100KΩ	½		BTS-100K	
R35	220KΩ	½		BTS-220K	
R36	820Ω	1		BTA-820	
R37	47KΩ	½		BTS-47K	
R38	10KΩ	½		BTS-10K	
R39	100KΩ	½		BTS-100K	
R40	6800Ω	½		BTS-6800	
R41	10KΩ	½		BTS-10K	
R43	8200Ω	½		BTS-8200	
R43	15KΩ	½		BTS-15K	
R44	22KΩ	½		BTS-22K	
R45	47KΩ	½		BTS-47K	
R46	820Ω	1		BTA-820	
R47	47KΩ	½		BTS-47K	
R48	2200Ω	1		BTA-2200	
R49A	50KΩ	½		BTS-47K	
B	50KΩ	½		BTS-47K	
R50	1Meg	½		BTS-1Meg	
R51	220Ω	½		BTS-220	
R53	4700Ω	½		BTS-4700	
R53	1Meg	½		BTS-1Meg	
R54	470Ω	½		BTS-470	
R55	4700Ω	½		BTS-4700	
R56	2200Ω	1		BTA-2200	
R57	3300Ω	1		BTA-2200	

CHASSIS—BOTTOM VIEW



TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PEDERSEN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .25A	500VCT .013ADC	12VAC .720ADC	6.3VAC @ .72A	50-48					

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	PEDERSEN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.720ADC	1017	1017	C1B			604B	

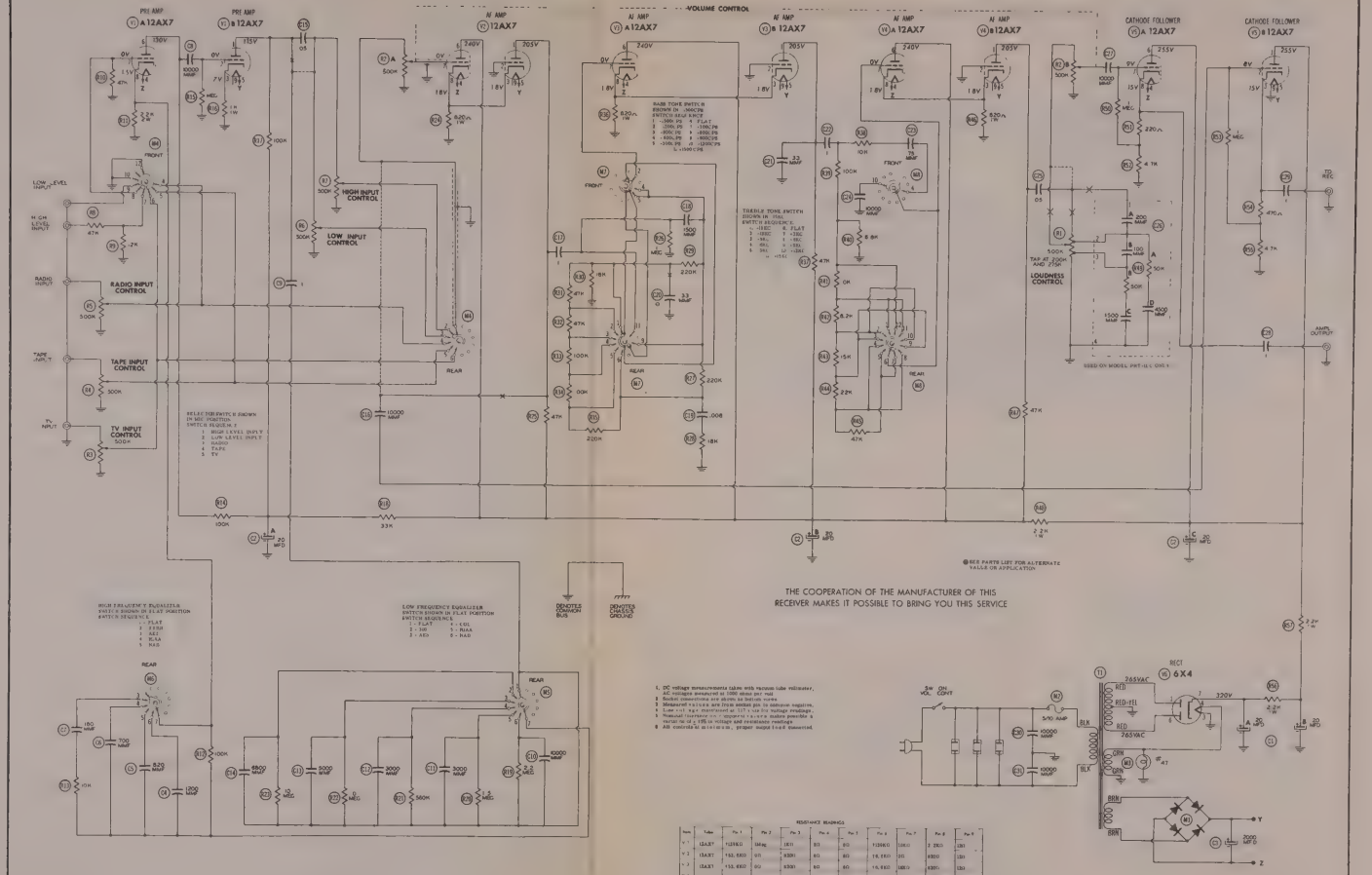
PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PEDERSEN PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	.5A 250V			312.500 (3AG-½A)	342001	AGC½	HKP

MISCELLANEOUS

ITEM No.	PART NAME	PEDERSEN PART No.	NOTES
M3	Pilot Light		#47
M4	Switch		Selector-(Rotary-Wafer Type)
M5	Switch		Low Freq. Equalization (Rotary-Wafer Type)
M6	Switch		High Freq. Equalization (Rotary-Wafer Type)
M7	Switch		Bass (Rotary-Wafer Type)
M8	Switch		Treble (Rotary-Wafer Type)


VOLUME CONTROL
PRE AMP V1 a 12AX7
PRE AMP V1 b 12AX7
AF AMP V2 12AX7
AF AMP V1 a 12AX7
AF AMP V1 b 12AX7
AF AMP V4 a 12AX7
AF AMP V4 b 12AX7
CATHODE FOLLOWER V5 A 12AX7
CATHODE FOLLOWER V5 B 12AX7
HIGH INPUT CONTROL
LOW INPUT CONTROL
RADIO INPUT CONTROL
TAPE INPUT CONTROL
TV INPUT CONTROL
LOUDNESS CONTROL
TREBLE TONE SWITCH
BASS TONE SWITCH
SELECTOR SWITCH
HIGH FREQUENCY EQUALIZER
LOW FREQUENCY EQUALIZER
RECT 6X4
THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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PEDERSEN
MODEL W-30

PEDERSEN
MODEL W-30

TRADE NAME	Pedersen Model W-30
MANUFACTURER	Pedersen Electronics, P.O. Box 572, Lafayette, Calif.
TYPE SET	AC Operated 30 Watt Audio Power Amplifier
TUBES (Five)	Types 12AU7 AF Amp.-Phase Inv., 12AU7 Driver, (2) 5881 Output, 5V4G Rectifier
POWER SUPPLY	110-120 Volts AC-50/60 Cycles
RATING	.82 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

PEDERSEN
Model W-30

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PEDERSEN PART No.	STANDARD REPLACEMENT		
V1	AF Amp. -Phase Inv.	12AU7	12AU7	9A	
V2	Driver	12AU7	12AU7	9A	
V3	Audio Output	5881	5881	7S	
V4	Audio Output	5881	5881	7S	
V5	Rectifier	5V4 G	5V4 G	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	PEDERSEN PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	4	300				HS691	MC-8450	SL-4508	
C2A	▲20	450				FP376.5	TM-D20-500	T-145	
B	▲20	450							
C3A	8	450				TCD71	TDL-D8-450	MTD-4508	
B	8	450							
C4	8	150				TC41	TD-8-150	MT-1508	
C5	1000			DD-102	801-001	DC521	IMP6-D1	K-1210	
C6	.01	600		D6-103	GP3-333-103	PT611	IMP6-S1	330611	
C7	.01	600		D6-103	GP3-333-103	PT611	IMP6-S1	330611	
C8	.1	400		DF-104		PT401	IMP4-P1	330401	
C9	.1	400		DF-104		PT401	IMP4-P1	330401	
C10	.22	400				PT4022	IMP4-P22	334022	
C11	.22	400				PT4022	IMP4-P22	334022	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PEDERSEN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	15KΩ	4	21-010-596	4WK15000	A10-15K			Balance Wire-Wound
B	Shaft		Not Req.	Not Req.	RS-2			Attach to R1A
R2A	15KΩ	4	21-010-596	4WK15000	A10-15K			Bias Wire-Wound
B	Shaft		Not Req.	Not Req.	RS-2			Attach to R2A

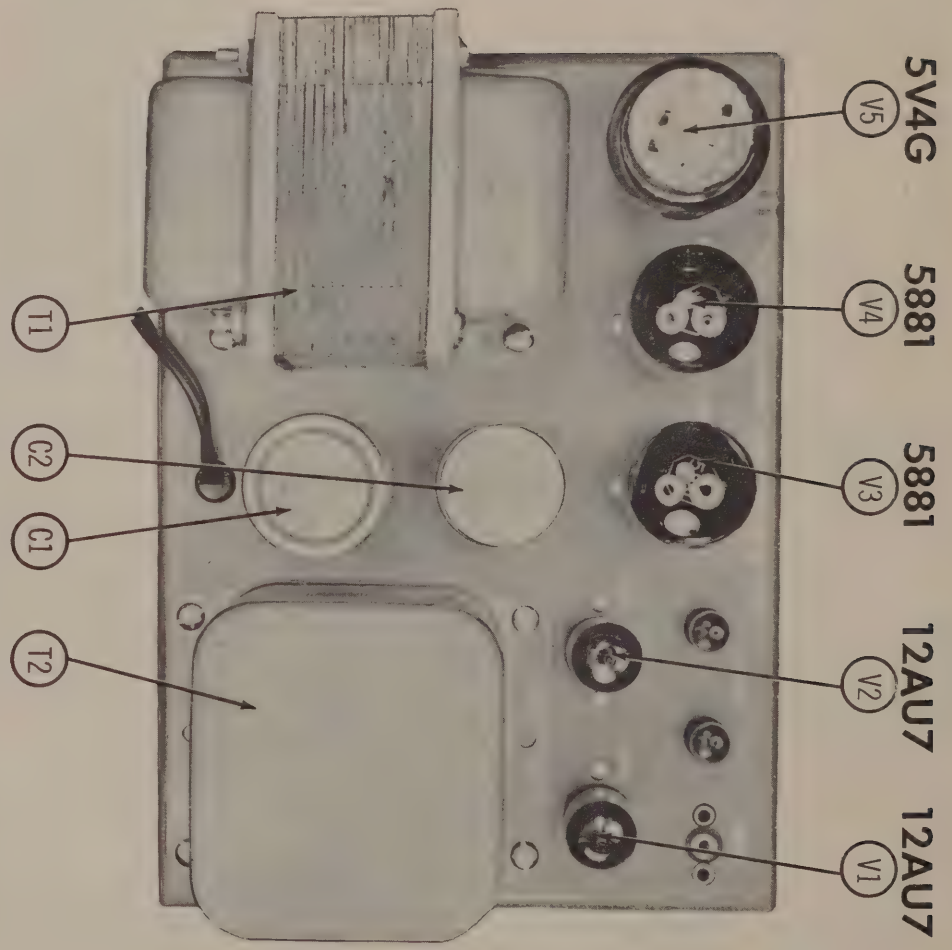
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PEDERSEN PART No.	IRC PART No.	
R3	470KΩ	½		BTS-470K	
R4	470Ω	½		BTS-470	
R5	10KΩ	½		BTS-10K	
R6	100KΩ	1		BTA-100K	
R7	33KΩ	½		BTS-33K	
R8	4700Ω	½		BTS-4700	
R9	47KΩ	½		BTS-47K	Note
R10	47KΩ	½		BTS-47K	Note
R11	22KΩ	½		BTS-22K	
R12	470KΩ	½		BTS-470K	
R13	390Ω	½		BTS-390	
R14	47KΩ	2		BTB-47K	Note
R15	470KΩ	½		BTS-470K	
R16	47KΩ	2		BTB-47K	Note

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	PEDERSEN PART No.	IRC PART No.	
R17	220KΩ	½		BTS-220K	
R18	220KΩ	½		BTS-220K	
R19	1000Ω	½		BTS-1000	
R20	68Ω	½		BTS-68	Note
R21	4700Ω	1		BTA-4700	
R22	220KΩ	½		BTS-220K	
R23	220KΩ	½		BTS-220K	
R24	1000Ω	½		BTS-1000	
R25	68Ω	½		BTS-68	Note
R26	4700Ω	1		BTA-4700	
R27	2200Ω	2		BTB-2200	
R28	100Ω	10		1 3/4A-100	
R29	82KΩ	2		BTB-82K	

Note: Resistors R9 & R10, R14 & R16, R20 & R25 are matched pairs (± 1%).

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PEDERSEN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .82A	820VCT .082A	5VAC @ 2A	6.3VCT @ 2.4A		P9400①		P-6143①		

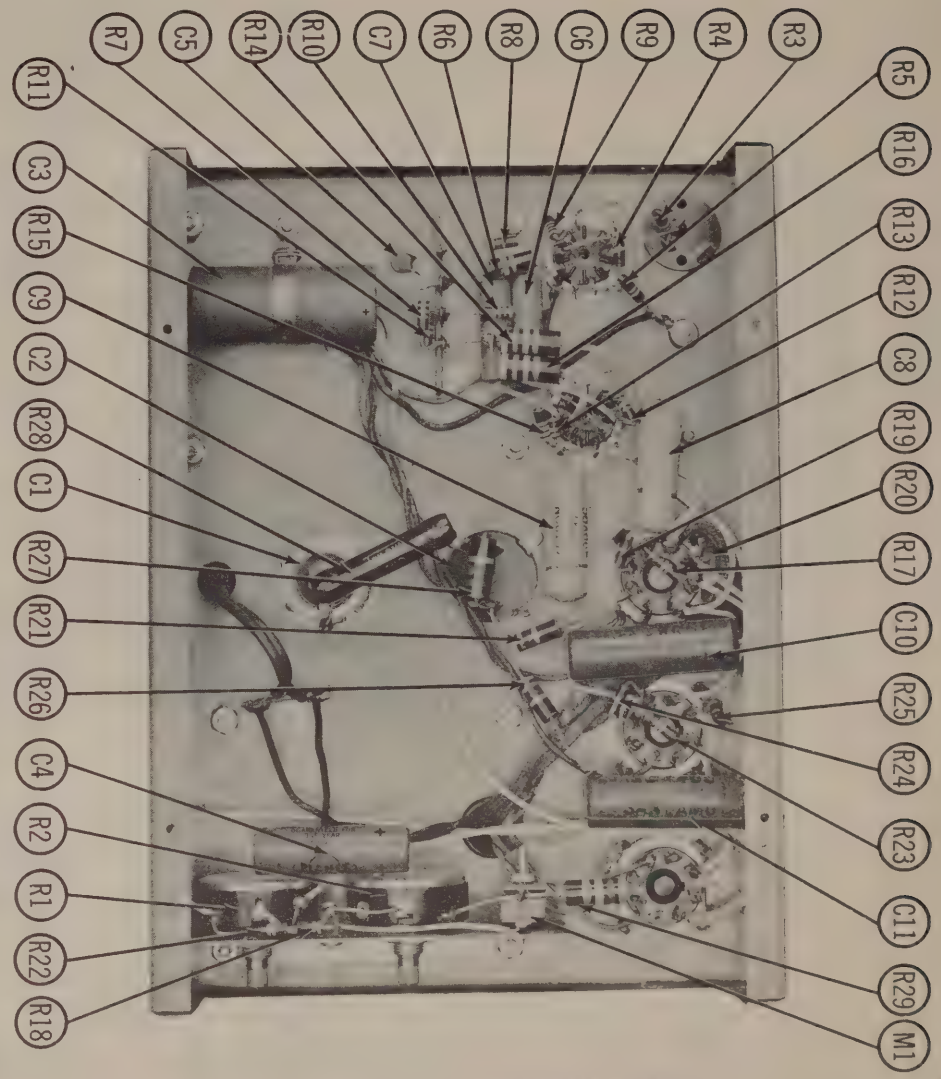
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PEDERSEN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.2KΩ	8-16Ω			A-3100①	A-8053①		S-35A①	① Drill new mounting holes.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	PEDERSEN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.0005 Amp.		1159①	CR-20①	8S20	8Y1	50	① Add mounting lugs, pigtail type.

CHASSIS—BOTTOM VIEW



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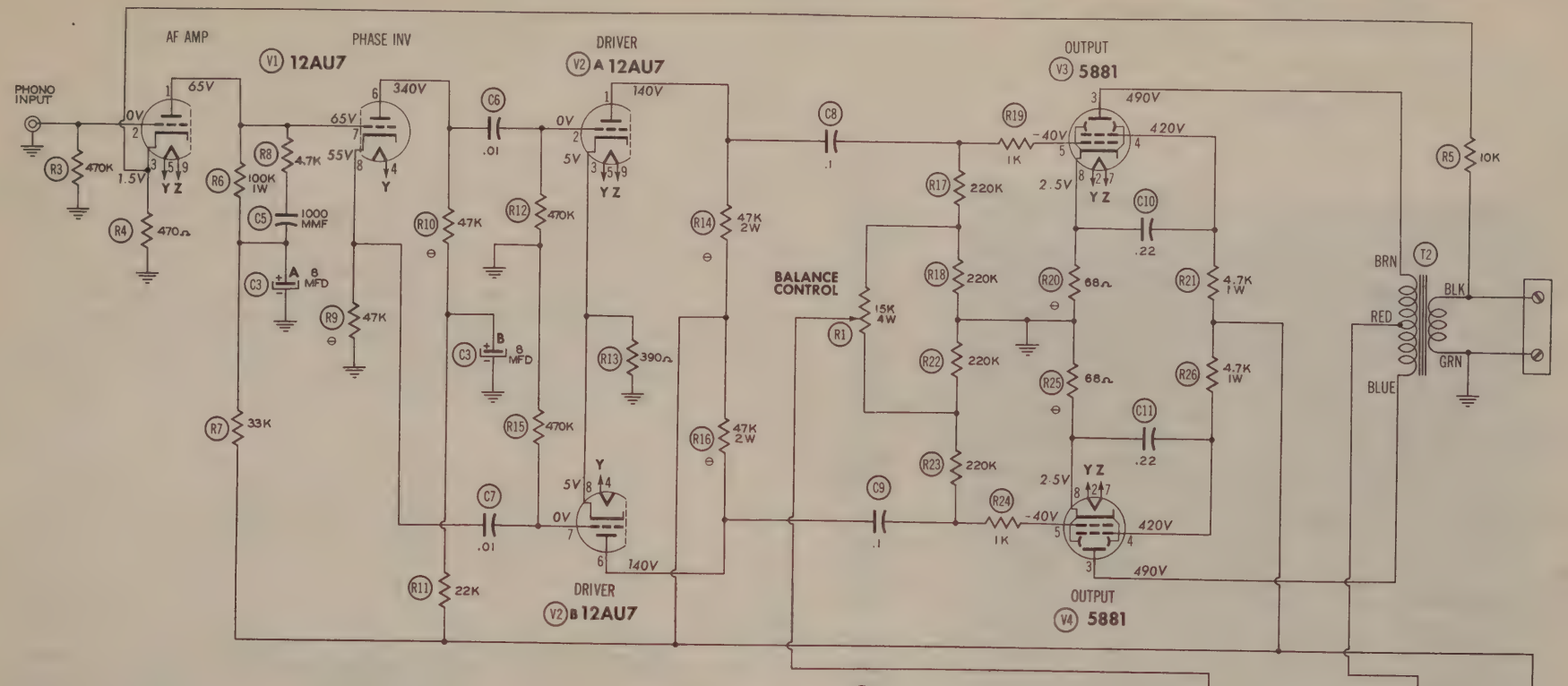

SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AU7	†135KΩ	470KΩ	470KΩ	.1Ω	.1Ω	†71KΩ	†135KΩ	47KΩ	.1Ω
V 2	12AU7	†49KΩ	470KΩ	390Ω	.1Ω	.1Ω	†49KΩ	470KΩ	390Ω	.1Ω
V 3	5881	TP	.1Ω	†200Ω	†7KΩ	350KΩ	TP	.1Ω	68Ω	
V 4	5881	TP	.1Ω	†200Ω	†7KΩ	350KΩ	TP	.1Ω	68Ω	
V 5	5V4G	NC	40KΩ	NC	50Ω	NC	50Ω	NC	40KΩ	

†MEASURED FROM PIN 8 OF V5.
TP-TIE POINT.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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290-7

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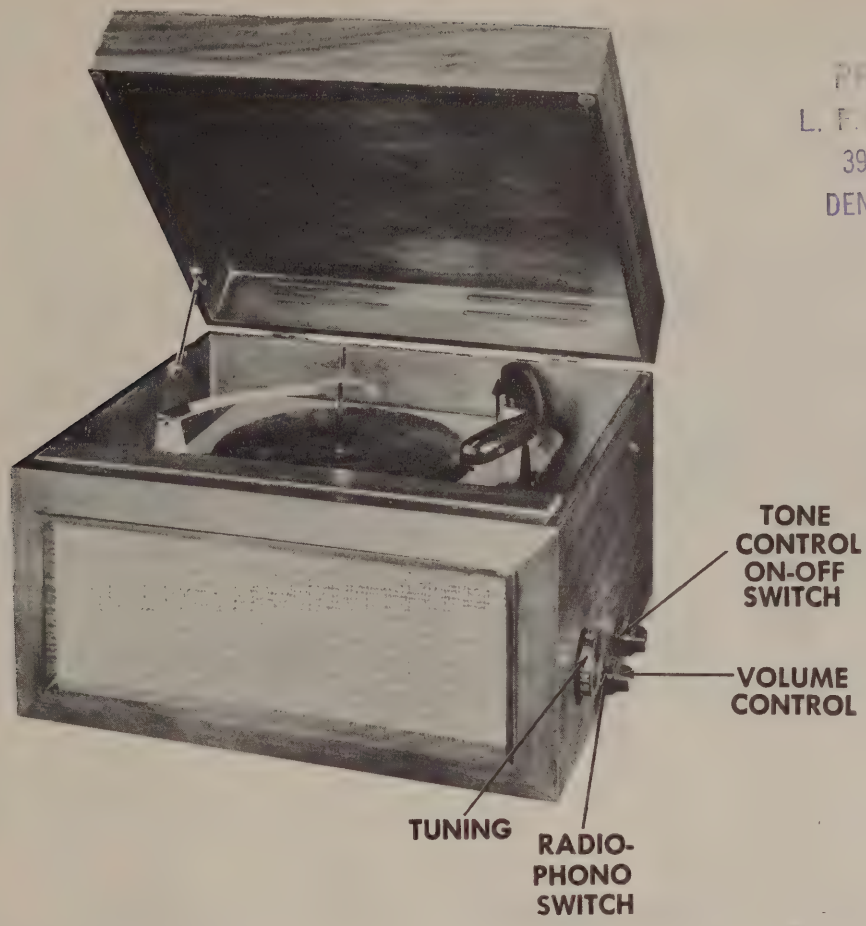
STEWART-WARNER
MODEL 9178-C



STEWART-WARNER
MODEL 9178-C

TRADE NAME Stewart-Warner Model 9178-C
MANUFACTURER Stewart-Warner Electric, Div. of Stewart-Warner Corp., 1300 N. Kostner Ave., Chicago 15, Ill.
TYPE SET AC Operated Radio-Phono Combination Receiver With 3 Speed Automatic Record Changer
TUBES (Six) Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-Phase Inv., 12AV6 AF Amp., (2) 35C5 Output

POWER SUPPLY 105-125 Volts AC-60 Cycles RATING .33 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST 540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna terminal lug on tuning gang. Low side to B-	455KC (400~Mod)	Point of non-interference	Across voice coil	A1, A2, A3	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	Direct	Loop	1625KC	1625KC	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.	"	"	1500KC	Tune to 1500KC signal	"	A5	"

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT - SEE SIMILAR V-M MODEL 950 - PHOTOFACT SET #216 FOLDER #11 OR RECORD CHANGER MANUAL CM-5.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

STEWART-WARNER MODEL 9178-C

ITEM No.	USE	REPLACEMENT DATA: Stewart-Warner PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-Phase Inv.	12AV6	12AV6	7BT	
V4	AF Amplifier	12AV6	12AV6	7BT	
V5	Audio Output	35C5	35C5	7CV	
V6	Audio Output	35C5	35C5	7CV	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Stewart-Warner PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.
C1A	●80	150	522793			FP311.7	TM-4040	Q-005
B	■40	150						
C	▲20	150						
C2	5	50	504937			TC30	TD-5-50	MMT-0505
C3	.05	400	512029	DF-503		PT415	IMP4-55	330415
C4	33		513028	D6-330	GP1K-330	UC-5433		K-1433
C5A	50		♦522907	PC-52 ♦	1403-03 ♦			
B	50							
C6	10000		513034	D6-103	811-01			
C7	.05	400	512029	DF-503		PT415	IMP4-S5	330415
C8	.05	400	512029	DF-503		PT415	IMP4-S5	330415
C9A	2500		*522790					
B	100							
C	50							
D	2500							
C10	5000		513051	D6-502	811-005	DC-525		
C11	.15	400	512041			PT4015	IMP4-P15	3304015
C12	47		513002		GP1K-470	UC-5447		K-1447
C13	5000		513051	D6-502	811-005	DC-525		
C14	5000		513051	D6-502	811-005	DC-525		
C15	5000		513051	D6-502	811-005	DC-525		
C16	.002	600	512201	D6-202	801-002	PT622	IMP6-D2	330622
C17	.002	600	512201	D6-202	801-002	PT622	IMP6-D2	330622
C18	.0047	600	522309	D6-472	811-0047	PT6247	IMP6-D47	3306247
C19	.1	400	512035	DF-104		PT401	IMP4-P1	330401

♦ Items C5A, C5B and R7 are combined in one unit.
* Items C9A, C9B, C9C, C9D, R10A and R10B are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Stewart-Warner PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	Switch		522788					Phono-Radio Switch - Note 1
B	1Meg	½						Volume-tapped @400KΩ & 200KΩ - Note 2
R2A	2Meg	½	522787	Q13-139	A47-2Meg-Z	AB-76	U-55	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R2A

Note 1. R1 includes switch, control, C9A, C9B, C9C, C9D, R9A, and R9B.
Note 2. Some versions may use an alternate control part ♦523038.

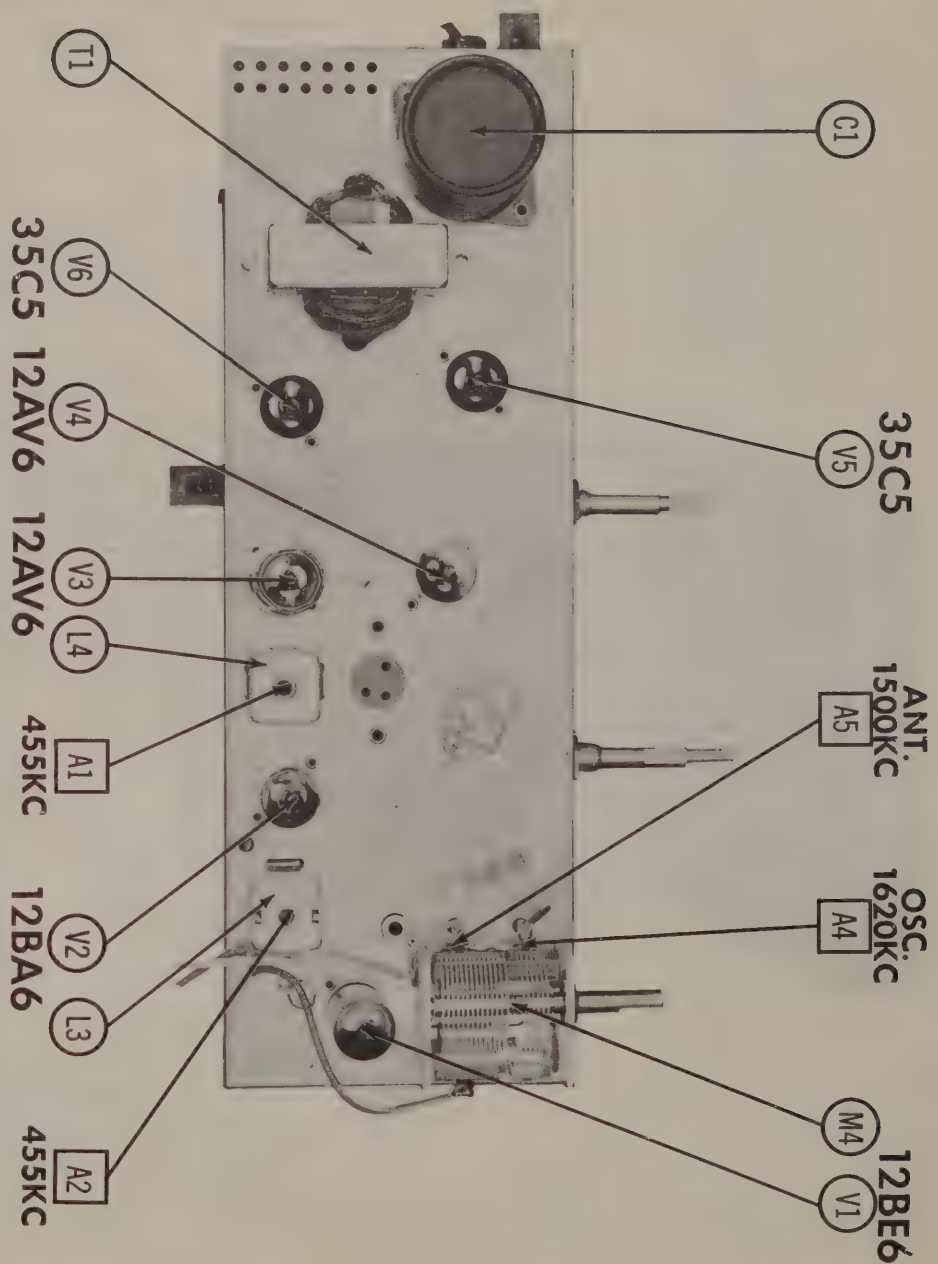
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stewart-Warner PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R3	22KΩ	½	510160	BTS-22K	
R4	100Ω	½	510118	BTS-100	
R5	150Ω	½	510121	BTS-150	
R6	470KΩ	½		BTS-470K	Note 1
R7	47KΩ	½	♦522907	BTS-47K	
R8	470KΩ	½	510184	BTS-470K	
R9	2.2Meg	½	510193	BTS-2.2Meg	
R10A	100KΩ	½	†522790	BTS-100K	
B	100KΩ	½		BTS-100K	
R11	6.8Meg	½	510196	BTS-6.8Meg	
R12	470KΩ	½	510184	BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Stewart-Warner PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R13	68Ω	½	510115	BTS-68	
R14	4700Ω	½	510148	BTS-4700	
R15	470KΩ	½	510184	BTS-470K	
R16	220KΩ	½	510178	BTS-220K	
R17	220KΩ	½	510178	BTS-220K	
R18	82Ω	2	510217		
R19	220KΩ	½	510178	BTS-220K	
R20	2200Ω	½	510142	BTS-2200	
R21	1000Ω	1	510236	BTA-1000	
R22	33Ω	1	510209		
R23	1000Ω	1	510136	BTS-1000	

Note 1. Not used in some versions.
♦ Items R7, C5A, C5B are combined in one unit.
† Items R10A, R10B, C9A, C9B, C9C and C9D are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.1	REPLACEMENT DATA Stewart-Warner PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	4.1KΩ CT	6.8Ω SEC.2 8.2Ω RES.	522782						

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA Stewart-Warner PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.4Ω	522771	6A15	
SP2	6"	PM	3.4Ω	522771	6A15	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Stewart-Warner PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop Ant.	3.4Ω		522772				
L2	Osc. Coil	.6Ω	8.5Ω	521550	14-1060 *	BC-387	71-OSC	
L3	Input IF	17Ω	17Ω	509433	16-6758	BC-352	12-C1	
L4	Output IF	42Ω	42Ω	521319	16-6758	BC-353	12-C2	

* Drill mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Stewart-Warner PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.104A	522785	1005A	RS-150	6S150	5P1	150	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA Stewart-Warner PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M2	523010	55-T	GDJ	47	0-1 or S-1 & 0-3	

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGES NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

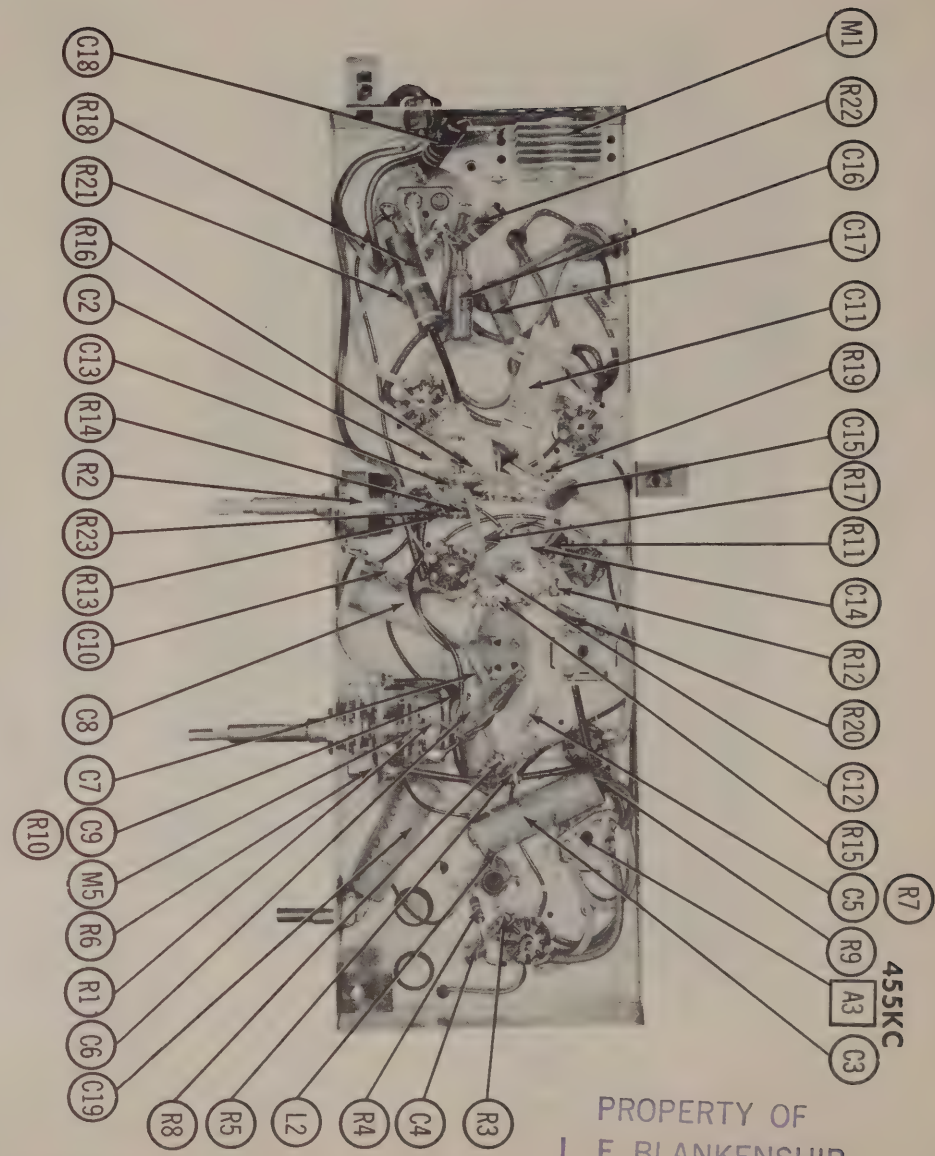
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA Stewart-Warner PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M3	523011	†S-66 or ♦†S-66SD or ♦S-66D	†AC-434 or ♦†AC-434D1 or †♦AC-434D2 or ♦AC-434D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	Stewart-Warner PART No.	NOTES
M4	Tuning Cap.	522784	2 Gang (10-370MMF, 10-105MMF)
M5	Switch	509205	On-off (Record Changer)
M6	Phono Motor	523036	
	Cabinet	523070	
	Lid	522906	Cabinet
	Knob	522896	Phono-Radio Switch
	Knob	522894	Tone (on-off)
	Knob	522892	Tuning
	Knob	522898	Volume

CHASSIS—BOTTOM VIEW



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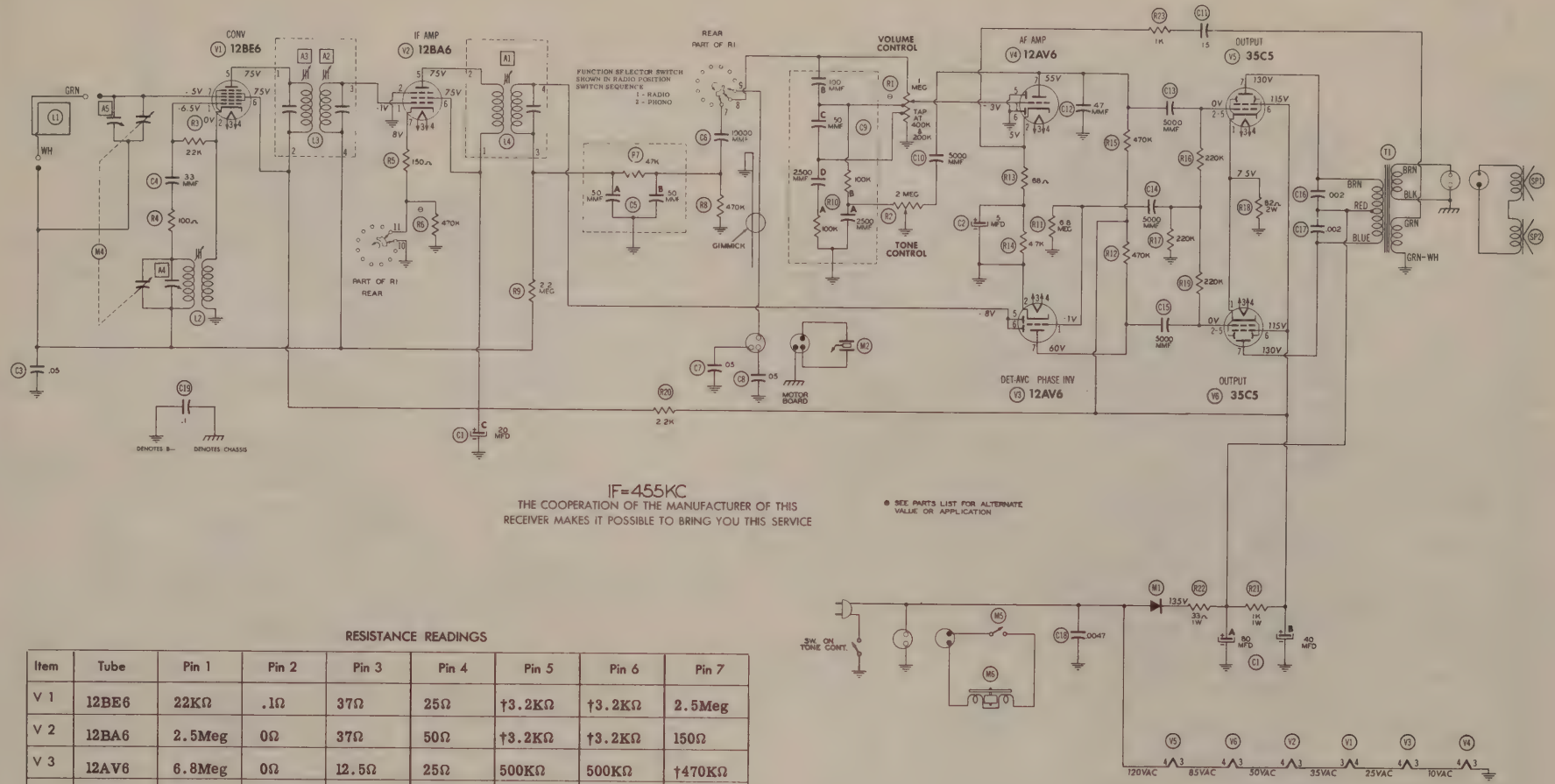
STEWART-WARNER MODEL 9178-C



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.1Ω	37Ω	25Ω	†3.2KΩ	†3.2KΩ	2.5Meg
V 2	12BA6	2.5Meg	0Ω	37Ω	50Ω	†3.2KΩ	†3.2KΩ	150Ω
V 3	12AV6	6.8Meg	0Ω	12.5Ω	25Ω	500KΩ	500KΩ	†470KΩ
V 4	12AV6	1Meg	4.7KΩ	0Ω	12.5Ω	0Ω	0Ω	†470KΩ
V 5	35C5	82Ω	440KΩ	85Ω	120Ω	440KΩ	†1KΩ	†170Ω
V 6	35C5	82Ω	440KΩ	50Ω	85Ω	440KΩ	†1KΩ	†170Ω

† MEASURED FROM OUTPUT OF M1

ALL READINGS TAKEN WITH RADIO-PHONO SWITCH IN "RADIO" POSITION

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 ohms per volt.
3. Socket connections are shown as bottom views.
4. Measured voltages are from socket pin to common negative.
5. Line voltage maintained at 117 volts for voltage readings.
6. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
7. Volume control at maximum, no signal applied for voltage measurements.

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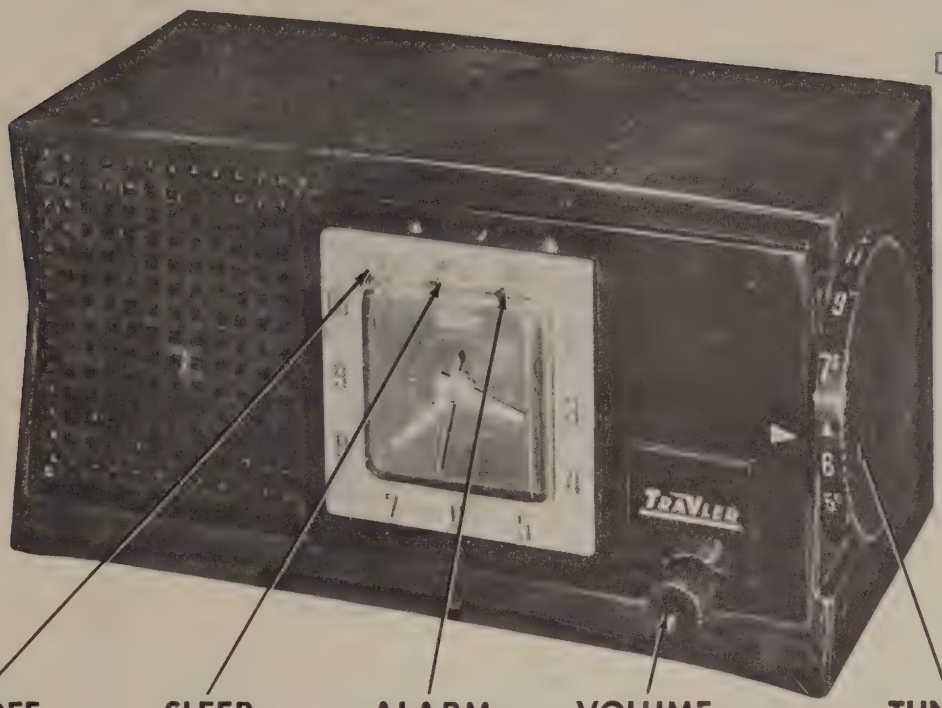
TRAV-LER
MODEL 55C42



TRAV-LER
MODEL 55C42

TRADE NAME	Trav-ler Model 55C42
MANUFACTURER	Trav-ler Radio & Tel. Corp., 571 W. Jackson Blvd., Chicago, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of siganl generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna terminal on gang. Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across Voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1610	"	"	A5	"
3.	"	"	540KC	Tuning gang fully closed.	" "	A6	"
4.		Loop	1400KC	1400KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TRAV-LER
Model 55C42

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		TRAV-LER PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det. -AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT	TRAV-LER PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	50	150				TCD49	TDL-D50-150	FMD-1550	
B	50	150							
C2	.05	400							
C3	47			D6-470	GP1K-470	UC-5447		K-1447	
C4A	220								
B	2000								
C	5000			♦PC-150	♦1408-01				
D	250								
E									
C5	5000			DD-502	811-005	DC525	IMP4-D5	C-1250	
C6	.05	600		DF-503		PT615	IMP6-S5	330615	
C7	.1	600		DF-104		PT601	IMP6-P1	330601	

♦ Items C4A, C4B, C4C, C4D, C4E, R6A, R6B and R6C are combined in one unit. When replacing items separately, items C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	800KΩ	½	VC-66	Q13-137	A47-1Meg-Z	BSK-70	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A

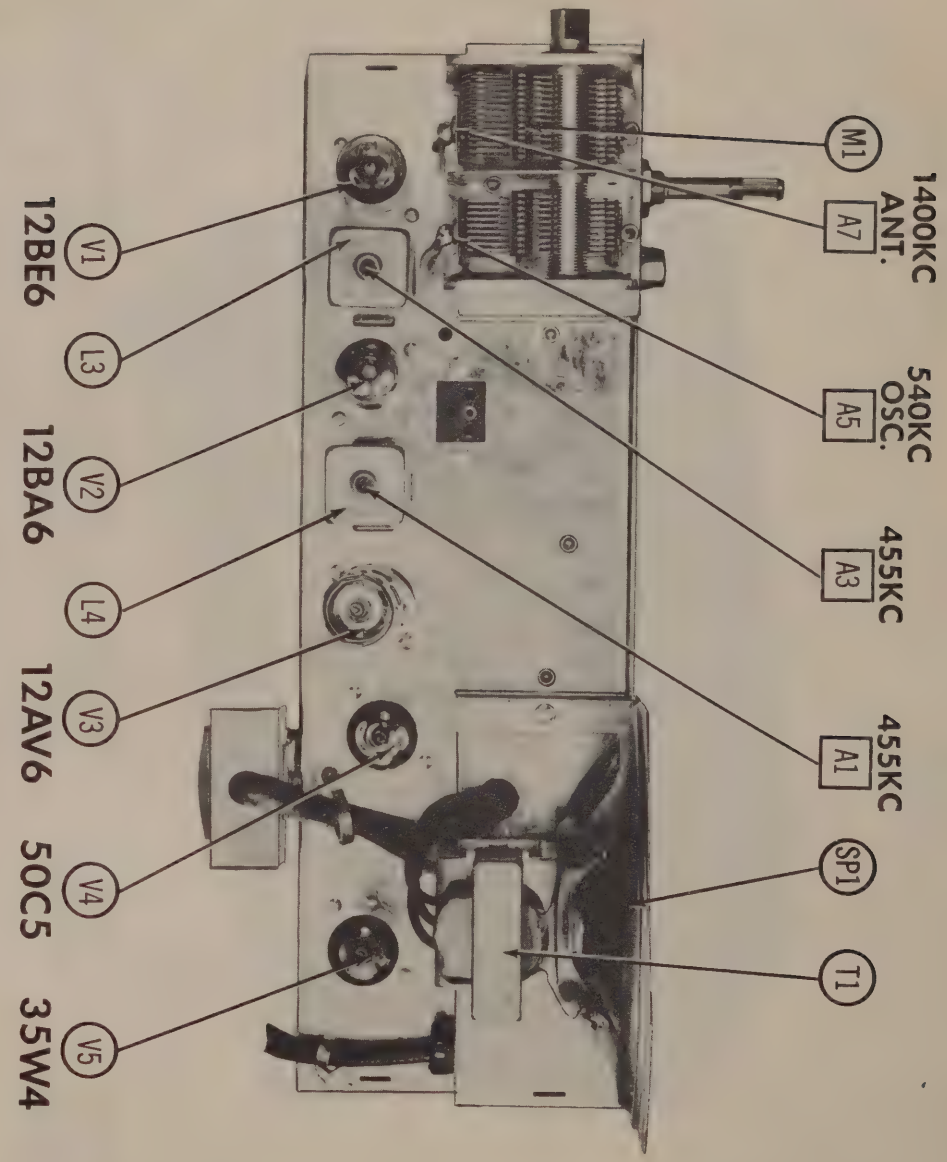
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRAV-LER PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	
R3	33Ω	½		BTS-33	
R4	220Ω	½		BTS-220	
R5	3.3Meg	½		BTS-3.3Meg	
R6A	6.8Meg	½		BTS-6.8Meg	
B	470K	½		BTS-470K	
C	470K	½		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRAV-LER PART No.	IRC PART No.	
R7	220Ω	½		BTS-220	
R8	1000Ω	1		BTA-1000	
R9	33Ω	½		BTS-33	
R10	220KΩ	½		BTS-220K	

♦ Items R6A, R6B, R6C, C4A, C4B, C4C, C4D, & C4E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.3KΩ	3.2Ω	Part of Spkr.	Z1102①	A-3031①	A-3330①	24S50A①	S-16X①	① Bend mounting tabs down. File OVT slots. Mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA: TRAV-LER PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3.2Ω	SPK-19	4A1	

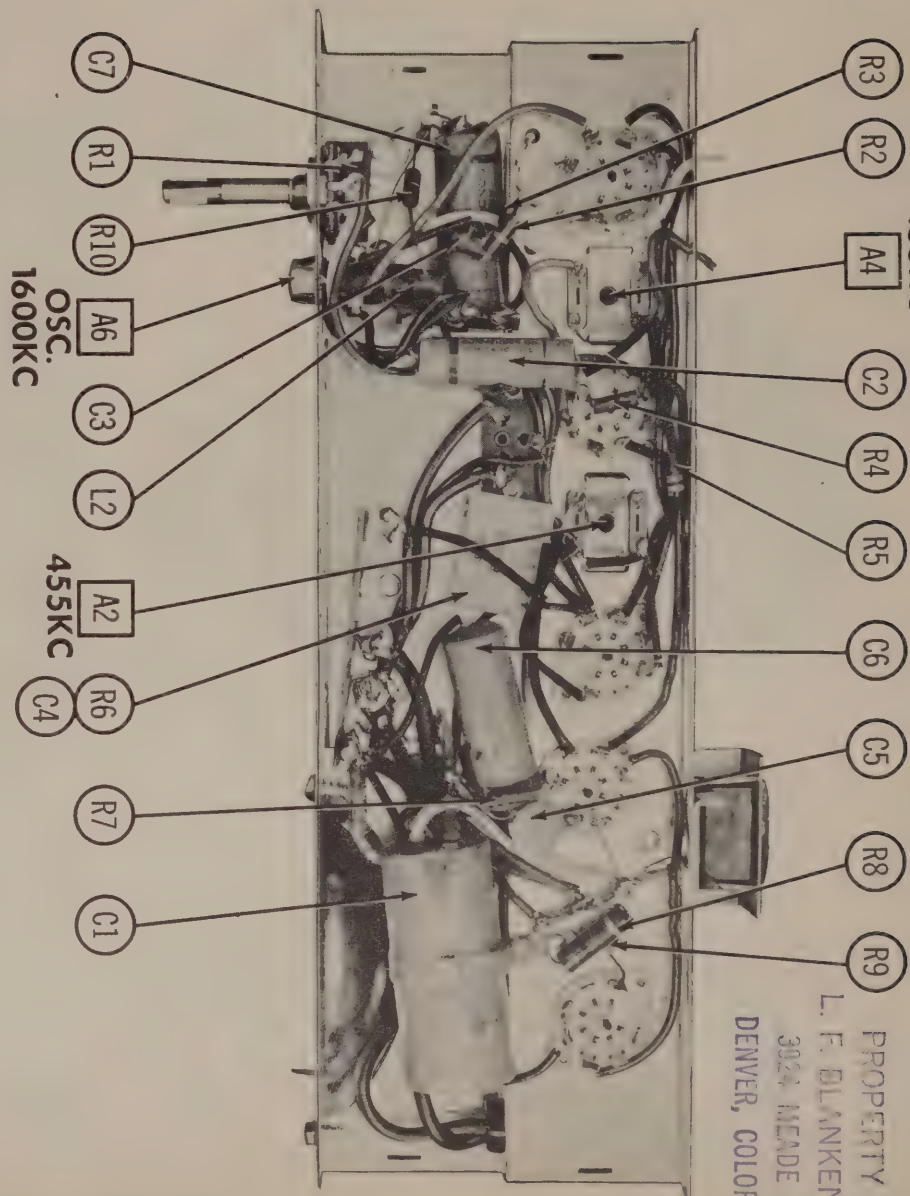
COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TRAV-LER PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Loop antenna	1.9Ω						Includes cabinet back
L2	Osc. coil	.6Ω	6Ω		14-1060	BC-387	71-Osc.	
L3	Input IF	24Ω	24Ω	LI-13	16-6758	BC-352	12-C1	
L4	Output IF	24Ω	24Ω	LI-13	16-6758	BC-353	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M1	Tuning Cap.	GC-17	2 Gang (21-465 MMF, 30-195 MMF)
M2	Switch		Radio (On-Off) SPDT Slide Type
M3	Clock		

CHASSIS—BOTTOM VIEW



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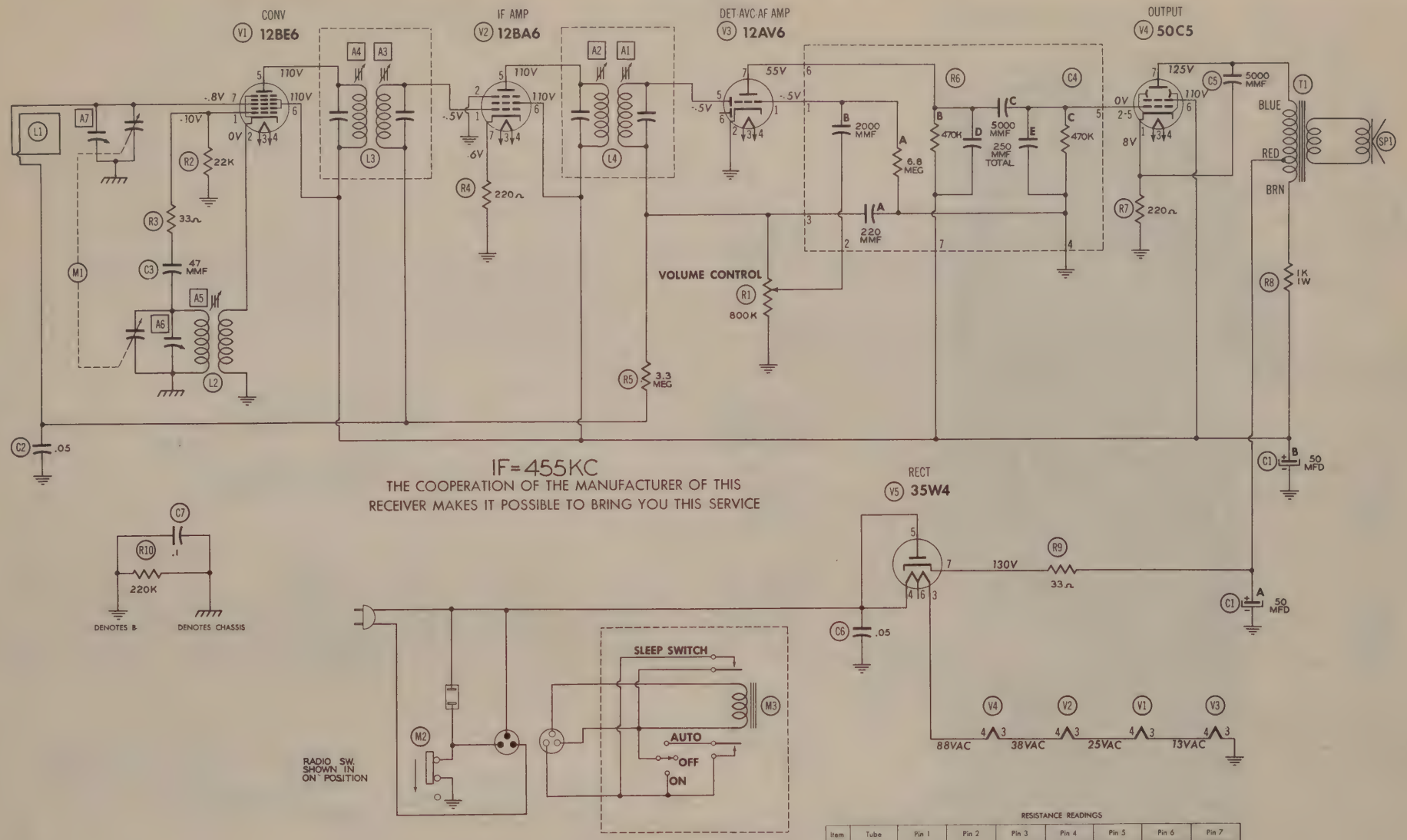
TRAV-LER Model 55C42



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.6Ω	13Ω	25Ω	†1KΩ	†1KΩ	4.3Meg
V 2	12BA6	4.3Meg	0Ω	25Ω	38Ω	†1KΩ	†1KΩ	220Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	13Ω	1Meg	INF	†470KΩ
V 4	50C5	220Ω	470KΩ	38Ω	88Ω	470KΩ	†1KΩ	†180Ω
V 5	35W4	NC	NC	88Ω	122Ω	122Ω	117Ω	40KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.
† MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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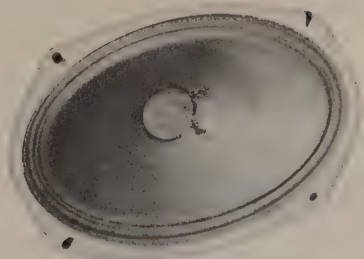
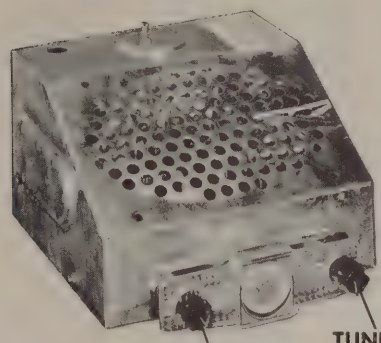
TRUETONE
MODELS D4425B, D4426A





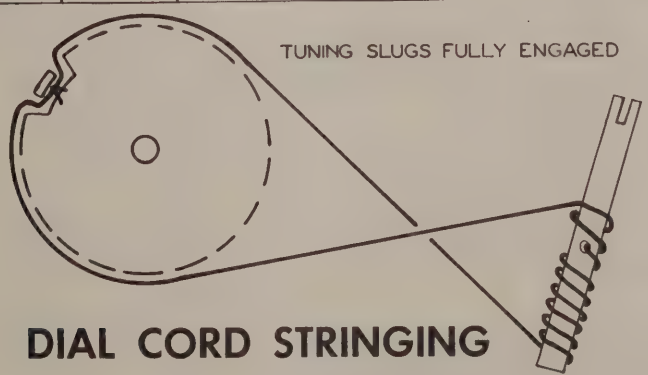
TRUETONE
MODELS D4425B, D4426A

TRADE NAME	Truetone Models D4425B (6 Volt), D4426A (12 Volt)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Battery Operated AM Superheterodyne Universal Automobile Receivers
TUBES (Eight)	Types 6BD6, 6BE6, 6BD6, 6AV6, 6C4 (2) 6AS5, 6X4 (6 Volt Models) Types 12BD6, 12BE6, 12BD6, 12AV6, 6C4, (2) 12AS5, 12X4 (12 Volt Models)
POWER SUPPLY	6 (or) 12 Volt Storage Battery
RATINGS:	7.6 Amp. @ 6.3Volts DC 3.8 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open (counter clockwise)	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.	50MMF	High side to antenna receptacle . Low side to chassis.	1400KC	Tune to max. signal	"	A6, A7	"



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PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D4425B

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	12BD6	12BD6	7BK	6BD6 used in 6V version
V2	Converter	12BE6	12BE6	7CH	6BE6 used in 6V version
V3	IF Amplifier	12BD6	12BD6	7BK	6BD6 used in 6V version
V4	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	6AV6 used in 6V version
V5	Phase Inverter	6C4	6C4	6BG	
V6	Audio Output	12AS5	12AS5	7CV	6AS5 used in 6V version
V7	Audio Output	12AS5	12AS5	7CV	6AS5 used in 6V version
V8	Rectifier	12X4	12X4	5BS	6X4 used in 6V version

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.
C1A	♦30	200	8C-23993			FP318.3		
B	♦20	200						
C	40	25						
C2	90		8F-21949					
C3	.0047	200	8D-21819	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247
C4	10		8G-19502	TCL-10				
C5	.047	200	8D-21823	DF-503		PT4147	IMP2-S47	3302147
C6	47		8G-12198	TCN-47	N750K-470	NT-5447		
C7	220	500	8F1-233	TCZ-220	NP0-335-221			KR-1322
C8A	100		♦201-155005	♦PC-50	♦1403-01	UC-531		K-1310
B	100					UC-531		K-1310
C9	.0047	200	8D-2189	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247
C10	.0047	200	8D-2189	D6-472	GP2-333-472	PT6247	IMP6-D47	3306247
C11	100		8G-23998	DD-101	801-101	UC-531		K-1310
C12	.022	200	8D-21822	DD-203	817-02	PT4122	IMP2-S22	3302122
C13	.022	200	8D-21822	DD-203	817-02	PT4122	IMP2-S22	3302122
C14	.022	200	8D-21822	DD-203	817-02	PT4122	IMP2-S22	3302122
C15	.0022	600	8D-23996	D6-222	GP2-333-222	PT6222	IMP6-D22	3306222
C16	.047	400	8D-21831	DF-503		PT4147	IMP4-S47	3304147
C17	.01	1000	8D-21836	DD16-103		PT1611	CT10-S1	
C18	.5	150	8D-24956			AM454	CT2-P5	330205
C19	.5	100	8D-19810			RF480	CT2-P5	330205
C20	.5	100	8D-19810			RF480	CT2-P5	330205
C21	1000		8G-22721	FT-1000	357-102			

♦ Items C8A, C8B and R8 are combined in one unit.

CONTROLS

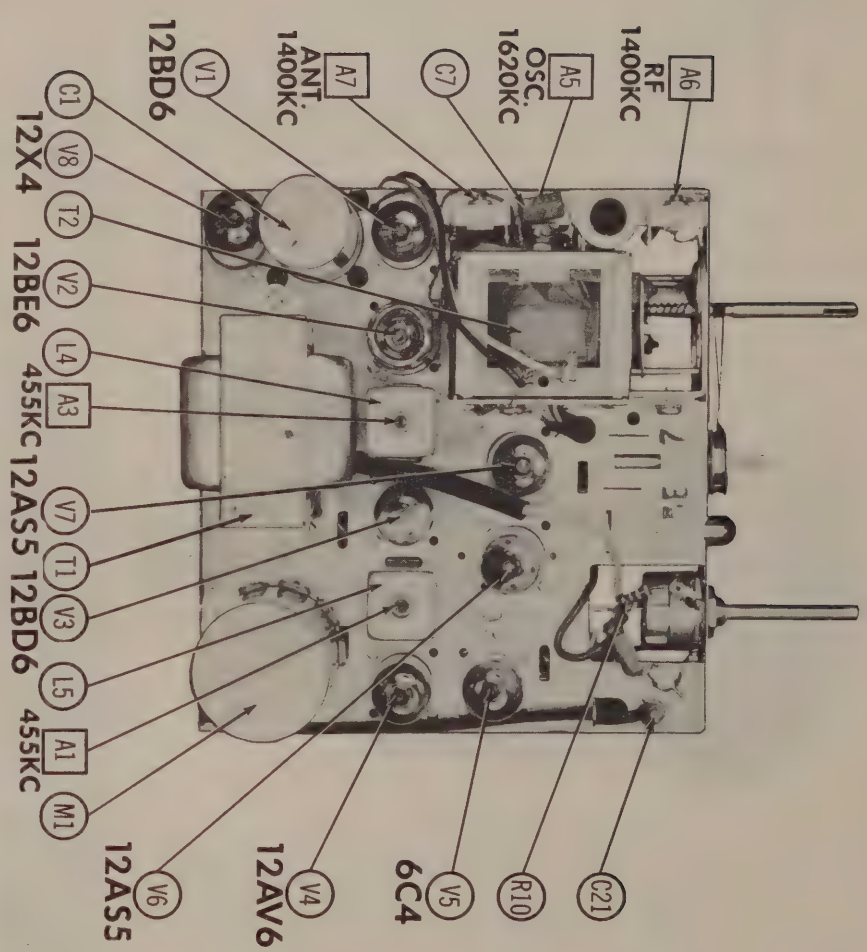
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	A-10A-21722	Q18-133X	A47F-500K	AB-60	UT-429	Volume (Tap @ 60KΩ)
B	Shaft		Not Req.	NQ	RS-3/16	AK-8	DS-37	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	1Meg	½	9B1-98	BTS-1Meg	
R3	220Ω	½	9B1-54	BTS-220	
R4	1Meg	½	9B1-98	BTS-1Meg	
R5	1Meg	½	9B1-98	BTS-1Meg	
R6	47KΩ	½	9B1-82	BTS-47K	
R7	220Ω	½	9B1-54	BTS-220	
R8	47KΩ	½	♦201-155005	BTS-47K	
R9	2.2Meg	½	9B1-102	BTS-2.2Meg	
R10	47KΩ	½	9B1-82	BTS-47K	
R11	6.8Meg	½	9B1-108	BTS-6.8Meg	
R12	470KΩ	½	9B1-94	BTS-470K	
R13	1Meg	½	9B1-98	BTS-1Meg	
R14	3300Ω 5%	½	9B1-171	BTS-3300 5%	
R15	51KΩ 5%	½	9B1-200	BTS-51K 5%	
R16	56KΩ 5%	½	9B1-201	BTS-56K 5%	
R17	470KΩ	½	9B1-94	BTS-470K	
R18	200Ω 5%	1	9B2-142	BTA-200 5%	
R19	470KΩ	½	9B1-94	BTS-470K	
R20	1200Ω	2	9B4-63	BTB-1200	
R21	39Ω 5%	1	9B2-125		Note 1
R22	4700Ω	½	9B1-70	BTS-4700	
R23	150Ω	1	9B2-52	BTA-150	Note 2
R24	150Ω	1	9B2-52	BTA-150	Note 2

♦ Items R8, C8A, C8B are combined in one unit.
Note 1. Not used in Model D4425B.
Note 2. Model D4425B uses a 56Ω resistor in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12VCT @2.08A OR 6.3VCT @3.6A	364VCT .074ADC			12A-24954					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.5KΩ	3.5Ω	12C-24015	Z1002 ①	A-2901 ①	A-3852 ①	24S61 ①	S-53X ①	① Bend mounting tabs down, file out slots, mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	
SP1	6 x 9"	PM	3.5Ω	18A-24035	69A3	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	11.5Ω						Part of tuner assy.
L2	RF Coil	12Ω						Part of tuner assy.
L3	Osc. Coil	.5Ω	5Ω					Part of tuner assy.
L4	Input IF	11.5Ω	11.5Ω	12C-24015	16-6758	BC-352	12-C1	
L5	Output IF	11Ω	11Ω	12C-24015	16-6758	BC-353	12-C2	
L6	Fil. Choke	0Ω		16M-19921			5221	2.5 Microhenries
L7	Fil. Choke	0Ω		16M-19921			5221	2.5 Microhenries
L8	RF Filter Choke	16Ω		16A-24018			6156	795 Microhenries

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA				NOTES
				TRUETONE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115∿	21B-23296	5301	859	5301	* Alternate 12V vibrator
M1	Interrupter	12V	115∿	21B-24952 21B-24495 *	6301	G859	6301	

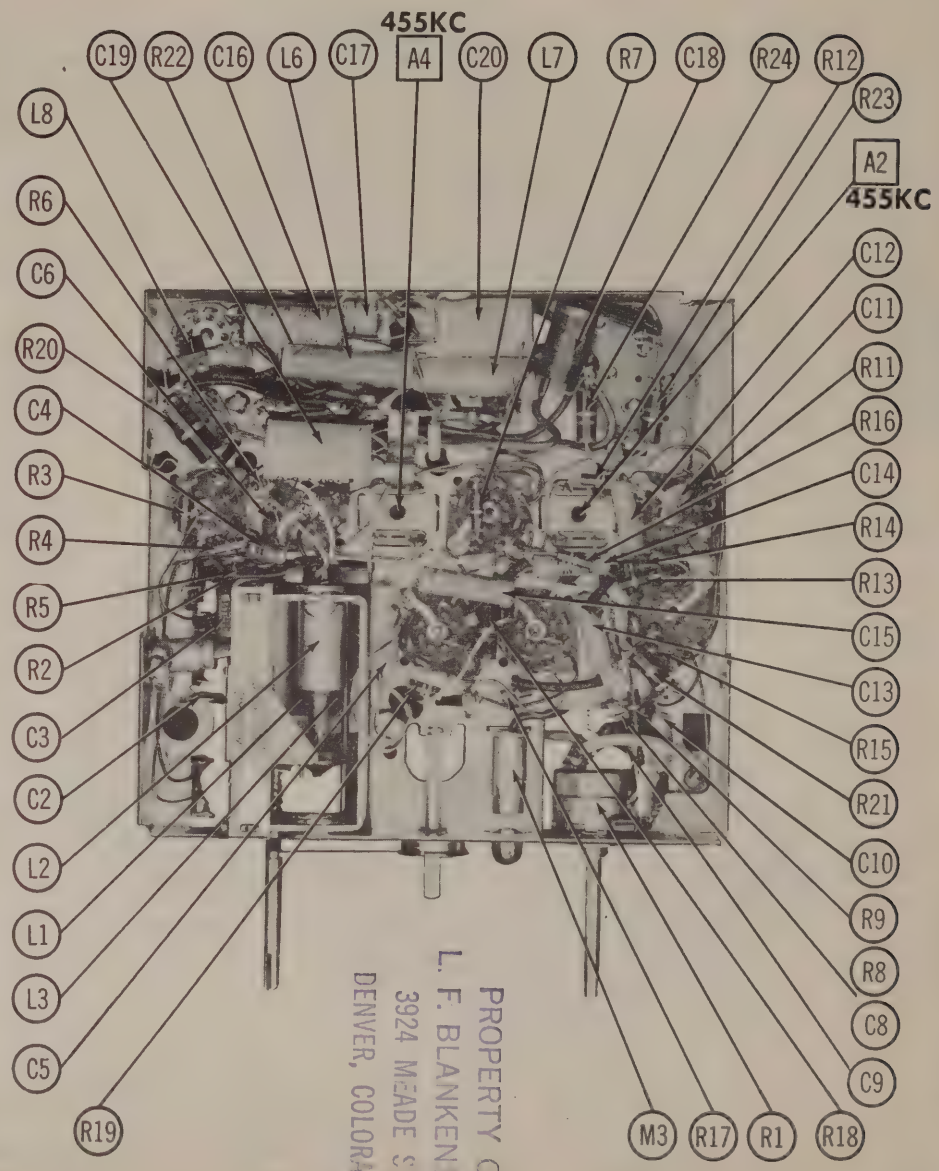
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			TRUETONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	14A 32V	46B-17993	201-23519	307014 (SFE14)	155014	SFE14	HRI

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	Dial Light	46A-22534	#1815 - Model D4426A
	Dial Light	46A-11739	#44 - Model D4425B
M4	Tuner Assy.	13F-21922	Includes L1, L2, L3
A5	Trimmer Cap.	8E-21728	Osc. Trimmer
A6	Trimmer Cap.	8E-21728	RF Trimmer
A7	Trimmer Cap.	8E-21728	Ant. Trimmer
	Chassis Case	2B-21738-F1	
	Knob	200-23227	Tuning &on-off-volume

CHASSIS—BOTTOM VIEW



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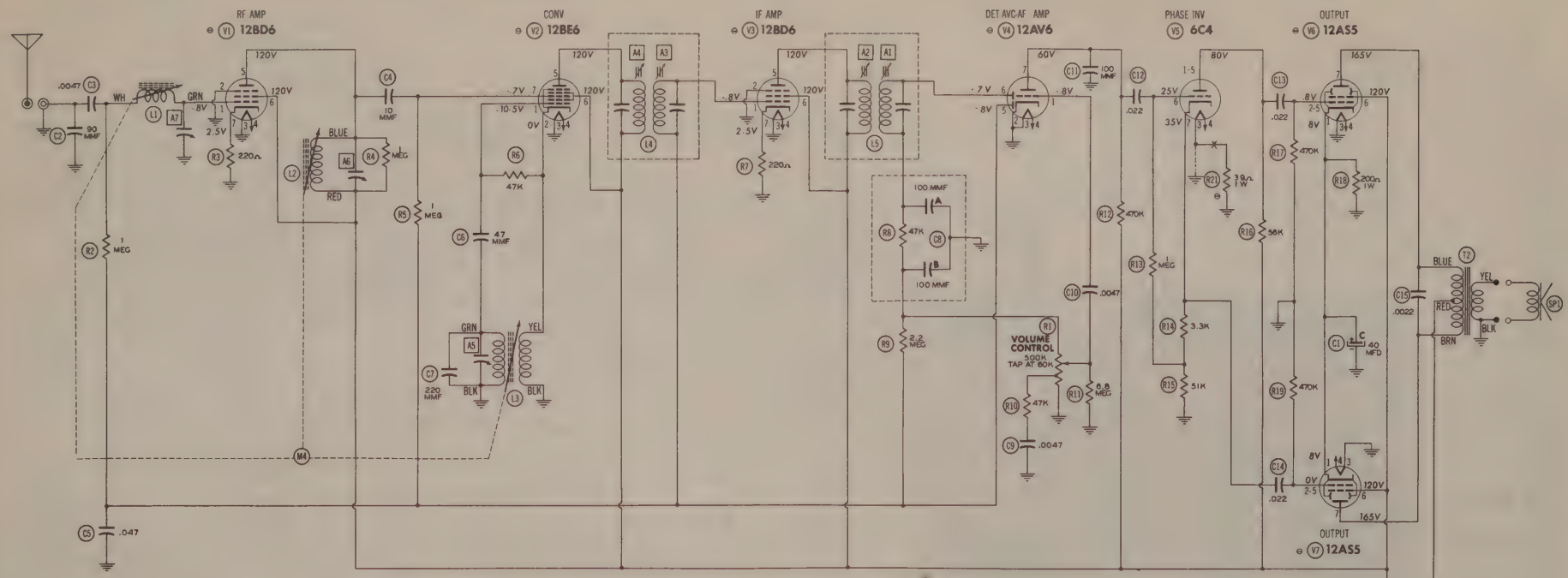
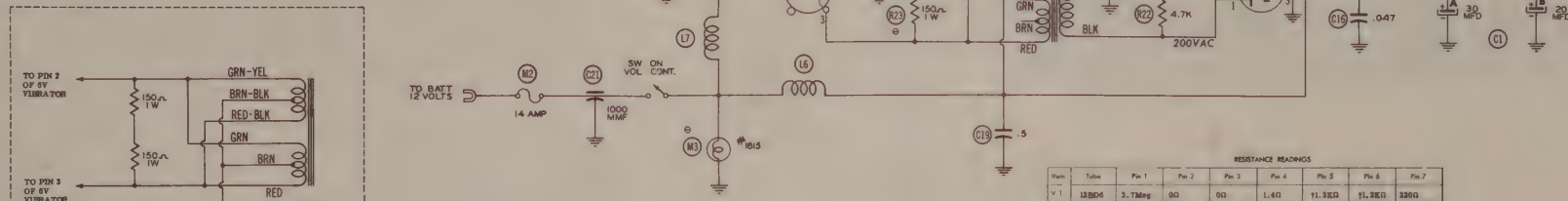
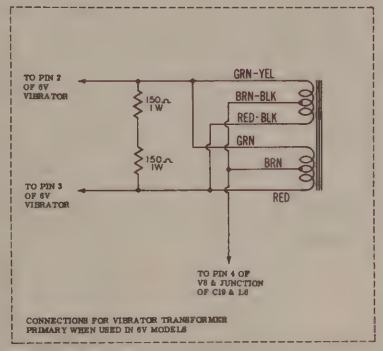


IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE





CONNECTIONS FOR VIBRATOR TRANSFORMER PRIMARY WHEN USED IN 6V MODELS

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BD6	3.7Meg	0Ω	0Ω	1.4Ω	†1.2KΩ	†1.2KΩ	220Ω
V 2	12BE6	47KΩ	.5Ω	0Ω	1.4Ω	†1.2KΩ	†1.2KΩ	3.7Meg
V 3	12BD6	3.7Meg	0Ω	0Ω	1.4Ω	†1.2KΩ	†1.2KΩ	220Ω
V 4	12AV6	8.6Meg	0Ω	0Ω	1.4Ω	2.7Meg	847KΩ	†470KΩ
V 5	6C4	197KΩ	NC	1Ω	1.4Ω	†97KΩ	1Meg	54KΩ
V 6	12AS5	200Ω	470KΩ	0Ω	1.4Ω	470KΩ	†1.2KΩ	†250Ω
V 7	12AS5	200Ω	470KΩ	0Ω	1.4Ω	470KΩ	†1.2KΩ	†250Ω
V 8	12X4	140Ω	NC	0Ω	1.4Ω	NC	140Ω	250KΩ

† MEASURED FROM PIN 7 OF V8
NC - NO CONNECTION

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Figure 1

GENERAL INFORMATION

V-M Model 1200 Tri-o-matic Record Changers are designed to play in automatic sequence a stack of records and shut off after playing of the last record.

As many as ten 12", twelve 10", or any assortment of 10" and 12" records (providing they are of the same speed and same type of groove) may be intermixed in any order.

A stack of twelve 7", 33 1/3 r. p. m. records or a stack of twelve 7", 45 r. p. m. records (with the use of a "45" Adaptor Spindle) will also play on this changer.

Record separation is accomplished by movement of a finger in the center spindle. This finger directly separates records having a 1/4" centerhole and actuates the knives and shelves of the centerpost used for the playing of 45 r. p. m. records having a 1 1/2" centerhole.

The tripping method used is the velocity type in which the trip link causes a trip pawl to engage a projection on the turntable hub and start the mechanism into cycle.

Connect this changer to an outlet supplying 117 volts, 60 cycle AC only, unless otherwise specified.

Manufactured by:

V-M Corporation
Benton Harbor, Michigan

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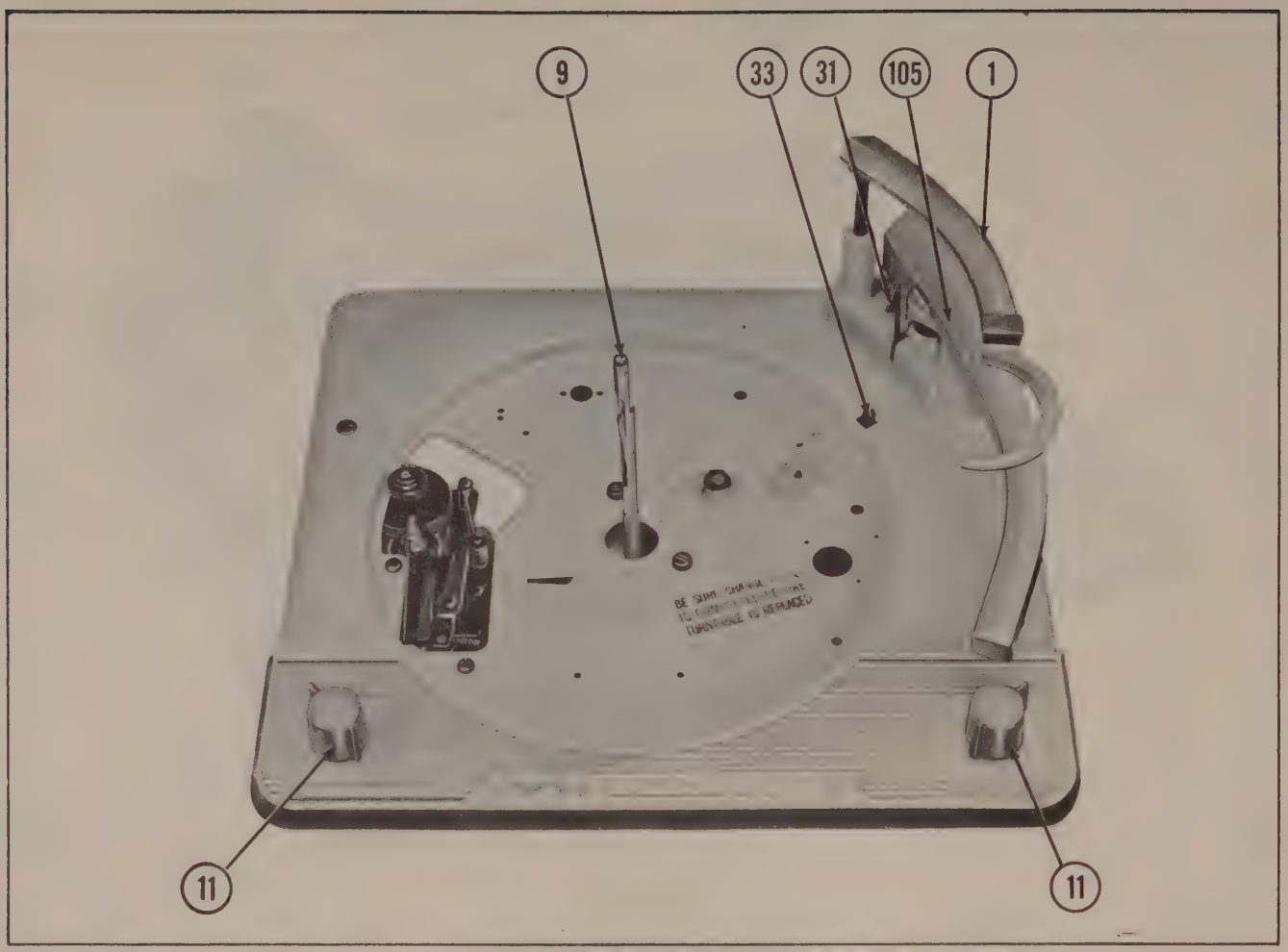

Figure 2

SPECIFICATIONS

Turntable Speed-

16 2/3, 33 1/3, 45, or 78 r.p.m.

Record Capacity-

Up to 12 seven-inch records.
Up to 12 ten-inch records.
Up to 10 twelve-inch records.
Up to 10 twelve and ten inch records intermixed.

CONTROLS

Two controls are provided on the baseplate, one on the right front corner and one on the left front corner.

The right-hand control is the Off-On-Reject control. Turning this control to the center or "On" position energizes the motor and starts the turntable, when turned to the right (clockwise) to the "Rej." position it starts the mechanism into complete automatic operation. The mechanism will shut off automatically after the last record has been played but can be shut off manually by turning this control to the left (counter-clockwise).

The left-hand control is the speed control. It has four normal positions, "16", "33", "45", and "S-78" to select the turntable speed desired. This control should be turned to the "S-78" position if the changer is not expected to be in use for an extended period of time.

PREPARING FOR OPERATION

Shipping Bolts—

Before placing in operation, the machine must be floated freely on the mounting springs. To float the changer, turn the two shipping bolts in a clockwise direction as far as they will go.

Leveling Record Changer—

It is essential to have the record changer absolutely level. Use a torpedo or similar type level on the record changer baseplate. Use adequate shims to level the record changer pan or combination cabinet to achieve perfect level.

OPERATING INSTRUCTIONS

Loading—

1. Pull straight up on record support knob (2) until record support clears spindle, swing support out over pick-up arm.

2. Place records on spindle and lower to offset shelf. Hold records level and replace record support over spindle.

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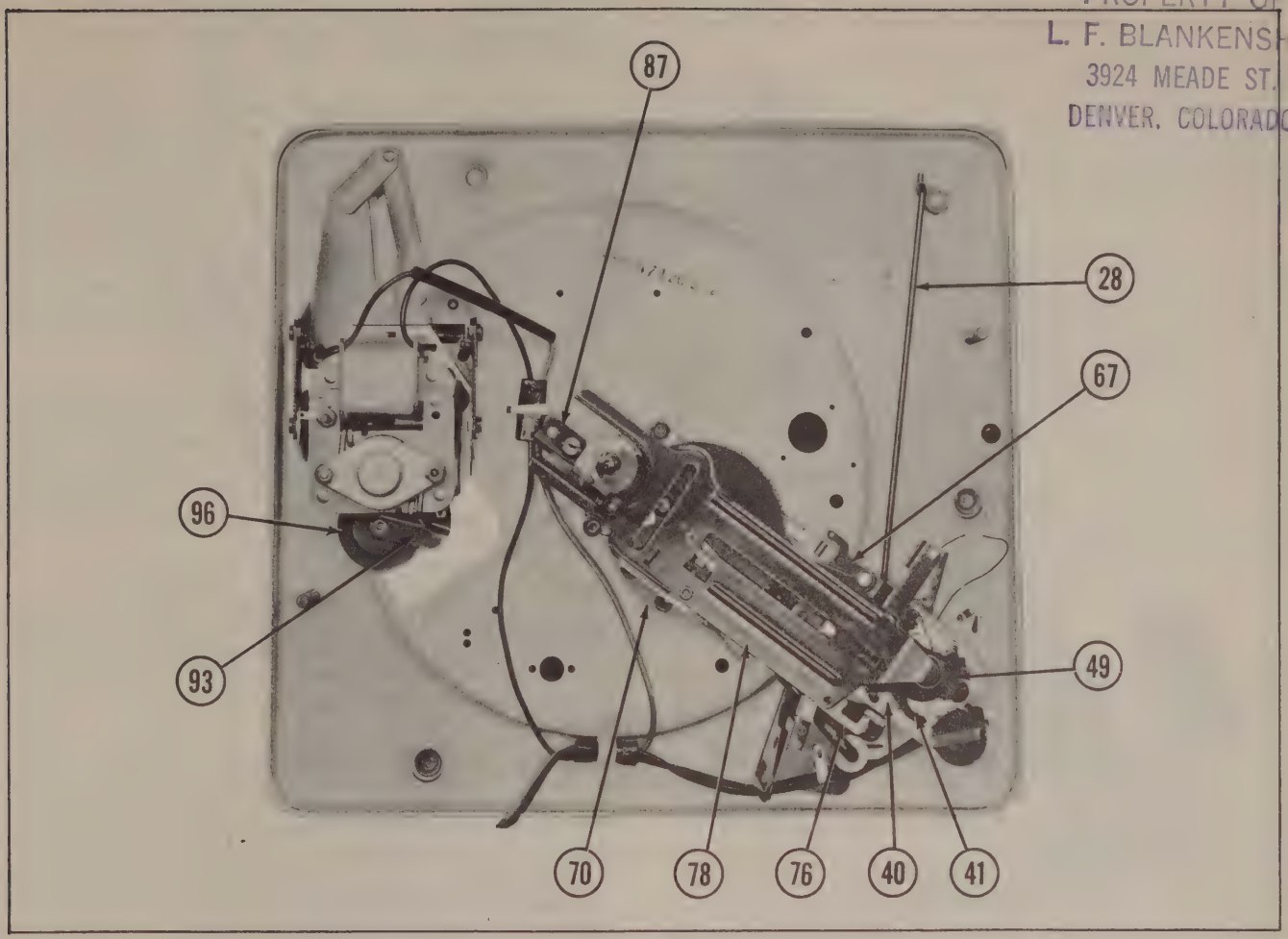


Figure 3

Starting—

To start the machine, after checking that the stylus and speed controls are in the position corresponding to type records to be played, turn "Off - On - Rej." knob to "Rej." and release. The changer will operate automatically until the last record has been played, at which time, the pick-up arm is returned to its rest and the supply to the motor is switched off.

Rejecting—

To reject a record at any time while the changer is operating, turn "Off - On - Rej." knob to "Rej." and release.

Stopping—

The changer may be stopped any time a record is playing by turning changer control knob to "Off." Lift pick-up arm and place on rest.

Unloading—

Lift record support clear of spindle and swing out over pick-up arm. Using both hands, with fingers under the edge of bottom record, lift records straight up and off spindle.

Manual Operation—

Records that do not have starting and fast-finishing grooves must be played manually. To play records manually, lift the record support arm and swing to the right until clear of the turntable. Place record on spindle and lower to spindle shelf. Tilt record down toward left front of baseplate and lower to turntable. Turn changer control knob to "On" position only. Gently place needle on record.

Repeating Of 7", 10", Or 12" Records—

To repeat a record, swing record support clear of turntable, place record on turntable and start changer. Record repeats until control is turned "Off". If a 12" record is repeated, wait for the changer to finish cycling and reposition the pick-up arm manually to the 12" position.

CHANGE CYCLE

It is recommended that the change cycle operation be observed by rotating the turntable by hand. The action described below can then be readily followed and the function of each part more easily understood.

This changer is provided with what is known as velocity trip mechanism. The change cycle is started by the faster inward motion of the pick-up arm when the needle enters the trip grooves at the end of the record. Only records having fast-finishing grooves will operate this trip.

The pick-up arm and hinge assembly, and trip finger cam and shaft assembly (49) are secured together

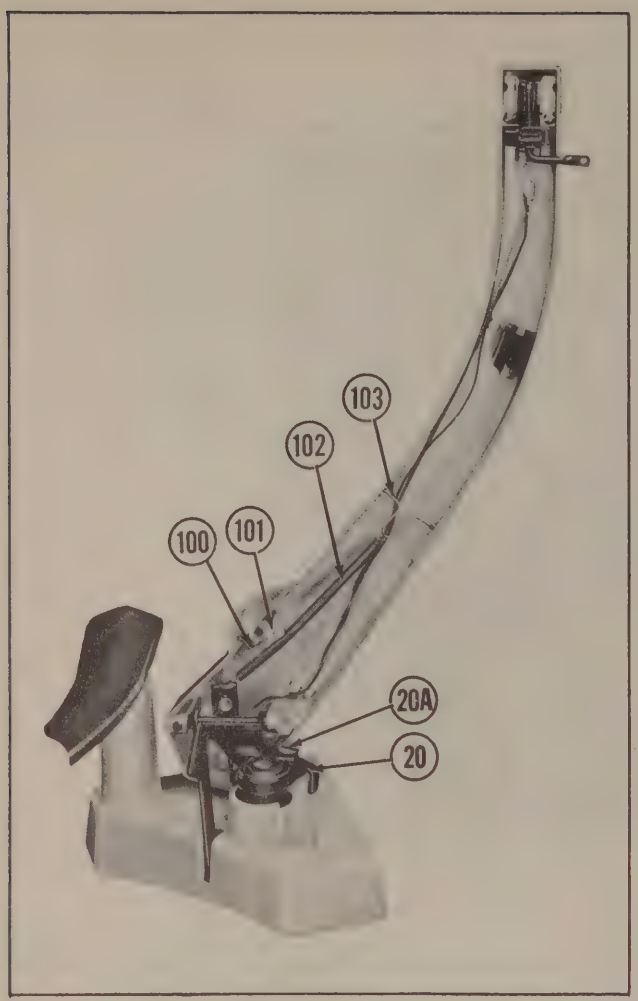
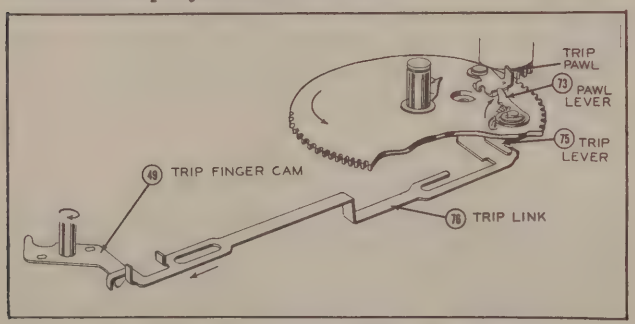


Figure 4

so that they move in unison, as the pick-up arm nears the end of a record, trip finger cam (49) pushes trip link (76), which, in turn, engages and pivots trip lever (75). As trip lever (75) pivots, pawl lever (73) pivots with it and carries the trip pawl toward the hub on the turntable. While a record is playing, the small motions of the trip pawl are not sufficient to cycle the mechanism because on each revolution of the turntable the wiping contact by the hub projection moves the trip pawl back to clear the projection.



In the first revolution of the turntable during which the pick-up arm advances rapidly, the trip pawl is moved far enough to definitely engage the projection on the turntable hub. The contact between the trip pawl and the turntable hub projection gives the necessary push for the teeth in main gear (70) to engage the teeth in the turntable hub, thus causing main gear (70) to rotate, This in turn, starts the lateral travel of the slide assembly (78). The slide assembly (78) moves to the rear thru the action of an eccentric mounted pin on main gear (70), which rides in the cross slot on the slide assembly (78).

As the slide assembly begins to move, the cam surface on the rear of the slide pushes lift pin (19) upward, raising the pick-up arm clear of the record. At the same time, trip finger cam (49) is pushed up by the force transfered through lift pin spring (51). The raising of trip finger cam (49) causes the two formed dimples in the trip finger cam to engage the two holes in the pick-up arm return locator (45), and couple them together. This directs the movement of the pick-up arm during the change cycle.

Slide assembly (78) continues to move away from the centerpost until the formed end of slide (78) pushes against the pick-up arm return locator (45). This relieves the force of pick-up arm return locator (45) against shut-off lever assembly (66), permitting shut-off lever spring (65) to return the shut-off lever (66) to the normal (raised) position.

After cycling slide (78) has raised the pick-up arm and is moving it outward, the tab on front of slide assembly (78) contacts the ejector bracket assembly (87). Ejector bracket (87) moves push rod (56) upward, actuating spindle assembly (9), to drop a record to the turntable.

Simultaneously, the trip pawl on top of main gear (70) contacts and rides along the curved finger of the muting switch bracket assembly (67). This action moves the trip pawl and its associated levers into a neutral position. This prevents the trip pawl from re-engaging with the projection on the turntable hub which would start a new change cycle.

At this time, the cam surface of the bracket located on top of main gear (70) moves reset lever (61) to its mid-position (10" set-down) where it is held by the 12" record selector (31). Slide assembly (78) continues to the rear and then starts forward.

If 7" records are being changed, the rubber bumper (33) on 7" set-down lever (58) is free to move upward. This action of 7" set-down lever (58) raises reset lever (61) to the upper position (7" set-down).

If 10" records are being changed, the 7" set-down lever (58) will not operate as the rubber bumper (33) will contact the edge of the 10" record and reset lever (61) will remain in the mid-position (10" set-down) as originally placed by the caming action of the bracket on top of main gear (70).

When a 12" record drops to the turntable, it strikes the 12" record selector (31) and forces it backward. This disengages the end of reset lever (61) from the edge of the 12" record selector (31) and permits the reset lever (61) to drop down into the recess at the bottom of the 12" record selector (31). This position of the reset lever (61) causes it to engage the bottom step of the pick-up arm return locator (45) and will push the pick-up arm to land on the edge of a 12" record.

As the slide assembly (78) continues forward, the tab on the rear of the slide moves clear of the pick-up arm return locator (45) and the trip finger cam (49), which are still locked together. This action permits the pick-up arm return spring (43) to move the pick-up arm inward until one of the three set-down

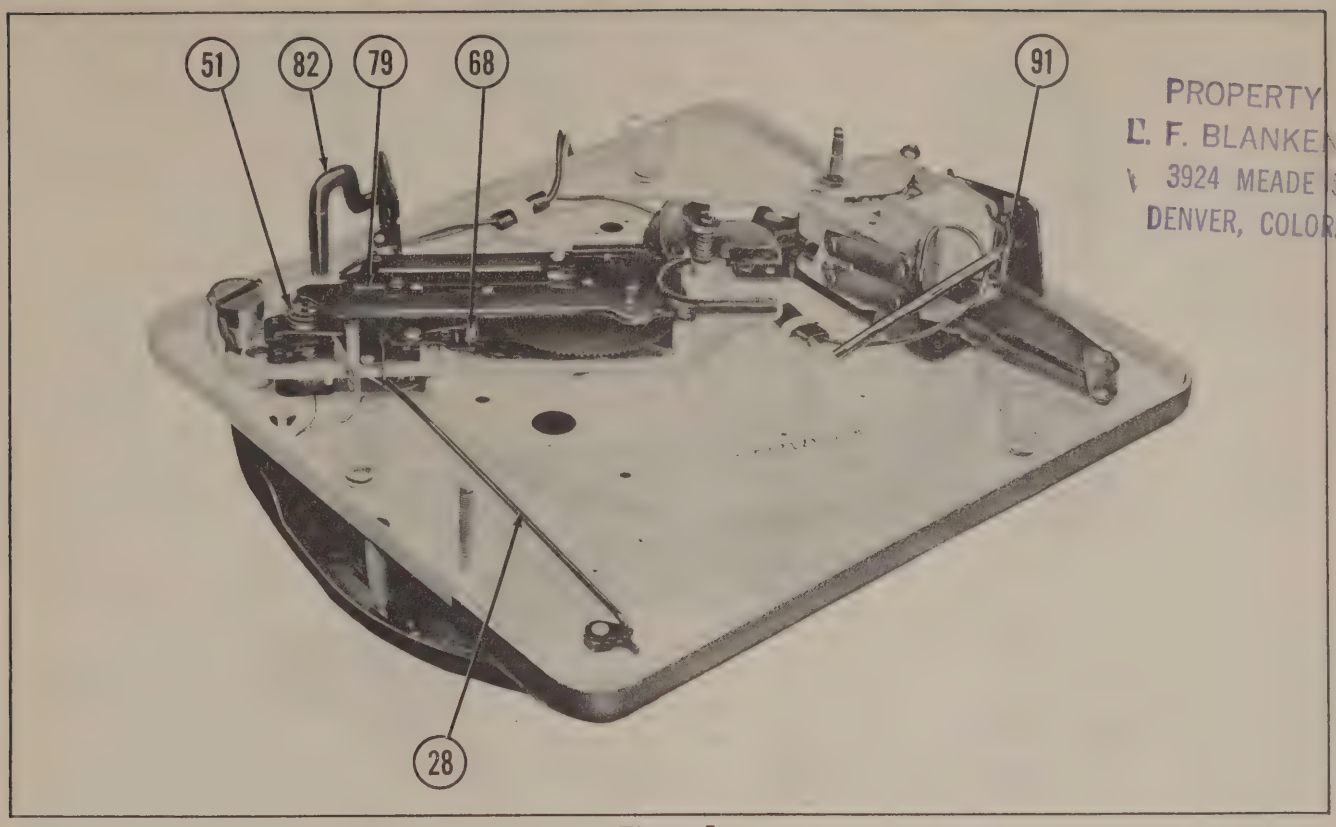


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Figure 5

steps in the pick-up arm return locator (45) strike the reset lever (61), which has been positioned by the record being changed (see above). This stops the inward movement of the pick-up arm directly above the point of landing. The pick-up arm is then lowered to the lead-in groove of the record as the lift pin (19) rides down the incline on the rear of the slide assembly (78). As the pressure is released from lift pin spring (51), trip finger cam (49) and pick-up arm return locator (45) separate. This permits the pick-up arm to move freely across the record.

After the mechanism has been tripped it again follows the preceding sequence of cycling and playing the records until the last record of the stack has been played.

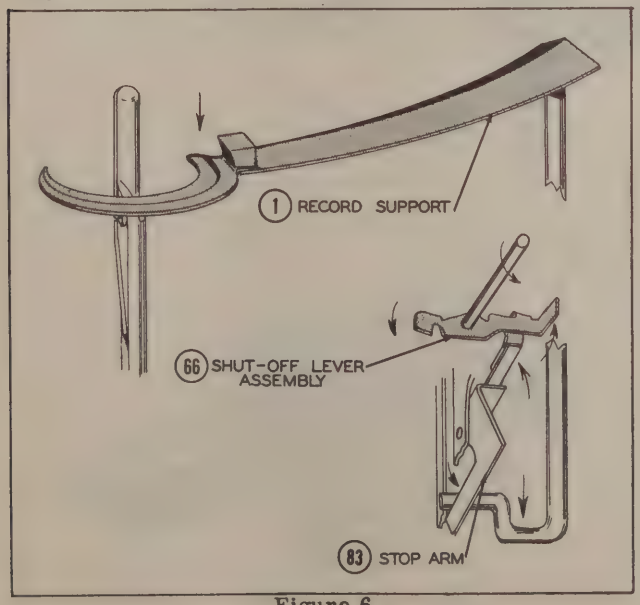


Figure 6

As the last record of the stack drops to the turntable the record support (1) drops below the shelf on the spindle assembly (9) and the lower end of record support shaft (82) contacts the stop arm on the record support guide assembly (83). This stop arm in turn applies force to shut-off lever (66). At this moment the cycling slide (78) is in the outermost position (away from centerpost) and the end of the shut-off lever (66) is forced against the escape lever (78A) which prevents it from lowering further. (See Figure 6)

As the cycling slide (78) returns to the out of cycle position the end of shut-off lever (66) slides off the escape lever (78A) permitting the end to extend down through the slot in the cycling slide. At this time the pick-up arm has rotated too far to be blocked by the other end of the shut-off lever (66) and the pick-up is permitted to land on the record.

After the last record has been played the mechanism again goes into change cycle, and the cycling slide (78) moves into its outermost position. At this moment the force which has been applied to the shut-off lever (66) from the record support shaft (82) causes the end of shut-off lever (66) to lower, thus extending further through the slot in cycling slide (78). The other end of shut-off lever (66) raises and blocks the pick-up arm return locator (45) which at this moment is held back by the cycling slide (78).

As the cycling slide (78) moves back toward the centerpost, it carries the raised trip link (76) along until finally the formed end of the trip link (76) pushes control lever (41) which in turn actuates power switch (42). This removes power from the motor and the mechanism stops.

As the slide assembly moves to the out of cycle position, lift pin (19) rides down the incline and lowers the pick-up arm to the rest post (23).

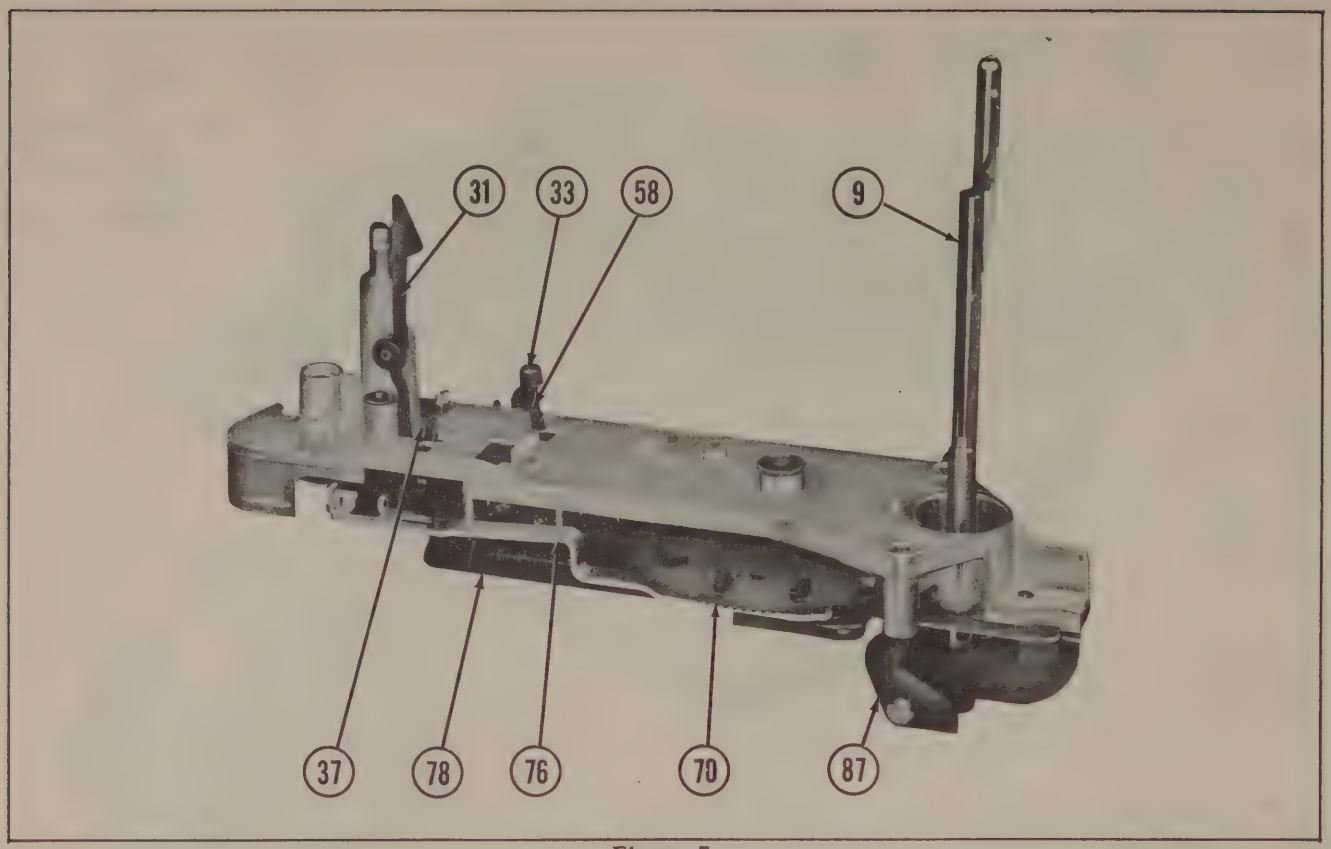


Figure 7

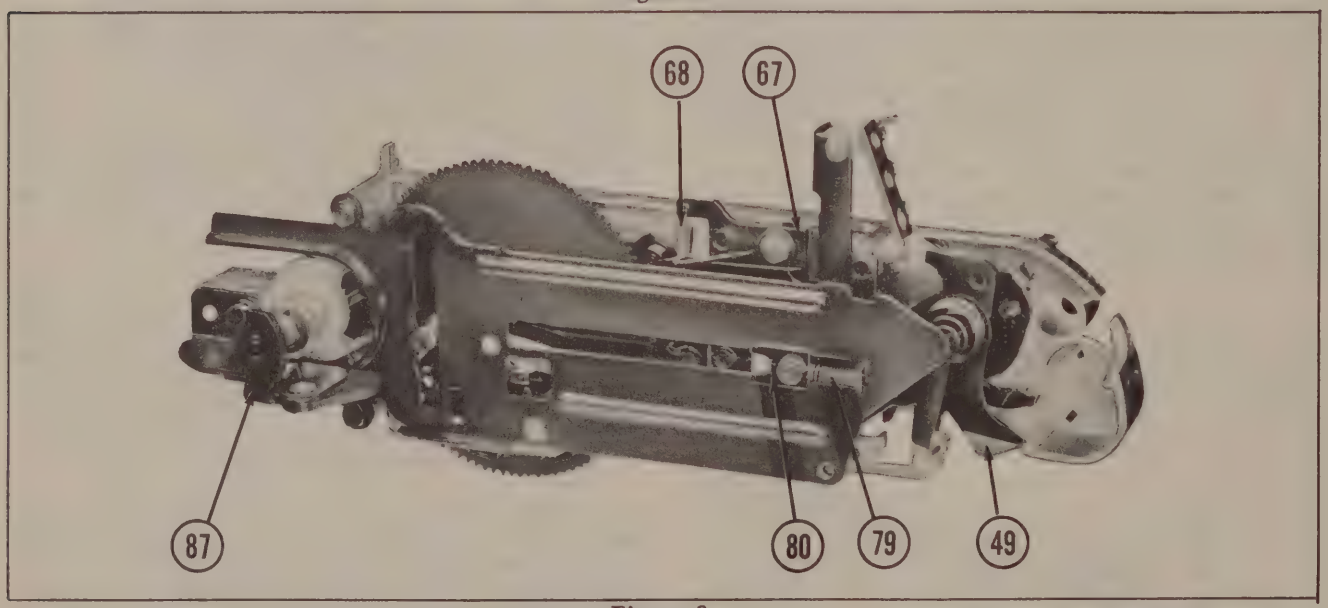


Figure 8

LUBRICATION

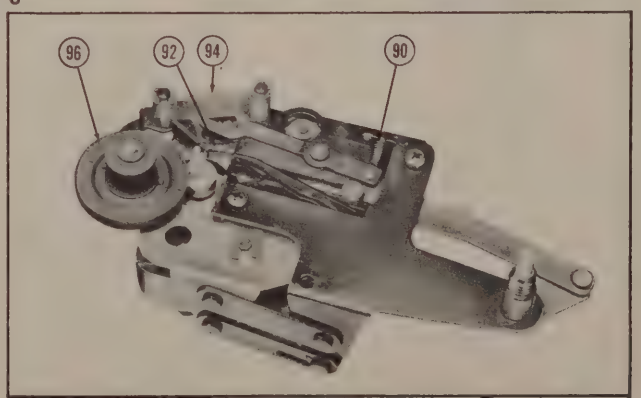
Additional lubrication should not be required for the life of the changer, but in cases of unusual use or high-operating temperature, the changer should be lubricated as follows: (Refer to the exploded view).

Apply Andok "B" or Texaco Sta-Put to:

1. Edges of all slots in slide assembly (78).

2. Outer edges of tines on forked end of slide assembly (78).

3. Lift pin cam surface on slide assembly (78).



Top View - Motor Assembly

4. Lower surface of pick-up arm return locator (45).
5. Inner surface of tab on rear of slide assembly (78).

Apply a small quantity of light mineral oil to:

1. Trip finger cam shaft (49).

ADJUSTMENTS

Needle Set-Down (Refer to Figure 4)-

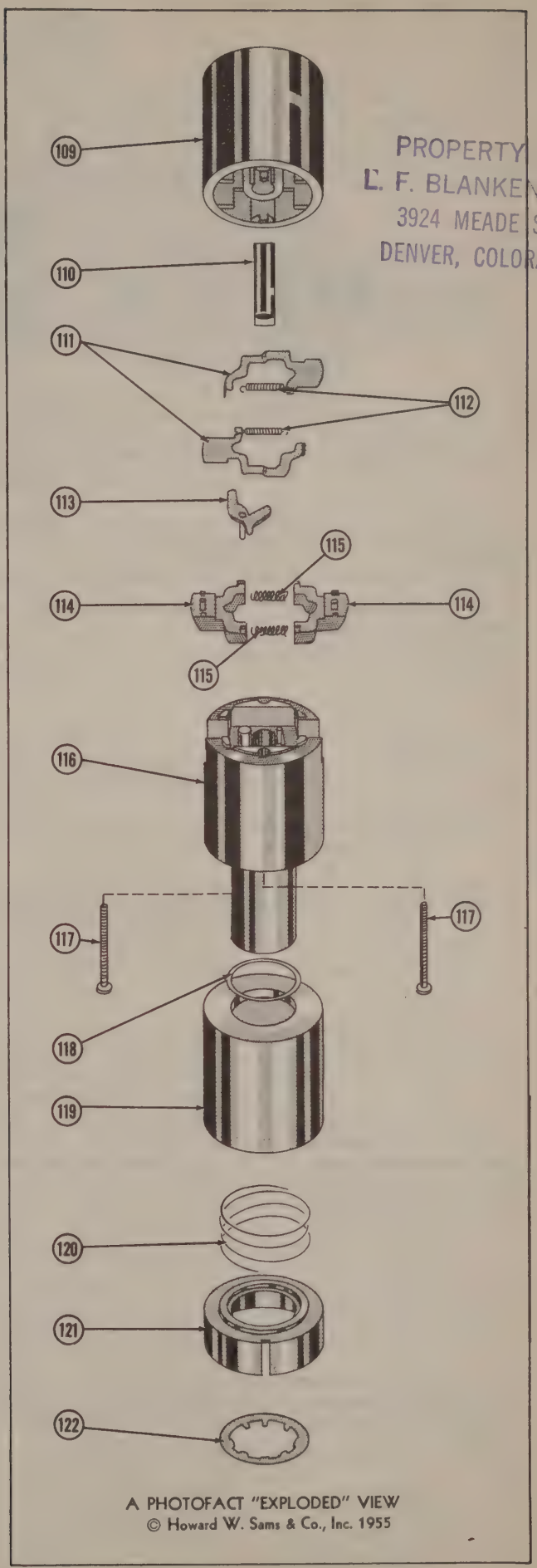
The set-down position of the needle is adjusted by means of the set-down adjustment screw (20A) mounted on the hinge arm assembly (20). Turn this screw adjusting pick-up arm for correct set-down on a 10" record. When the correct set-down is obtained for the 10" position, the 12" and the 7" needle set-down will also be correct.

Pick-up Arm Height (Refer to Figure 4)-

The pickup arm height is adjusted by the lift screw (101). To raise the height of the pick-up arm, turn this screw counterclockwise. To lower the pick-up arm, turn clockwise. The pick-up arm height should be adjusted so that with a 1 1/8" stack of records on the turntable the pick-up arm lifts 1/4" straight up as the change cycle starts.

Needle Pressure (Refer to Figure 4)-

The needle pressure should be between 8 and 10 grams. Adjustment is made by placing weight adjusting spring (103) in the slots, on the underside of the pick-up arm, which give the desired pressure.



Exploded View Of 45 RPM Spindle.

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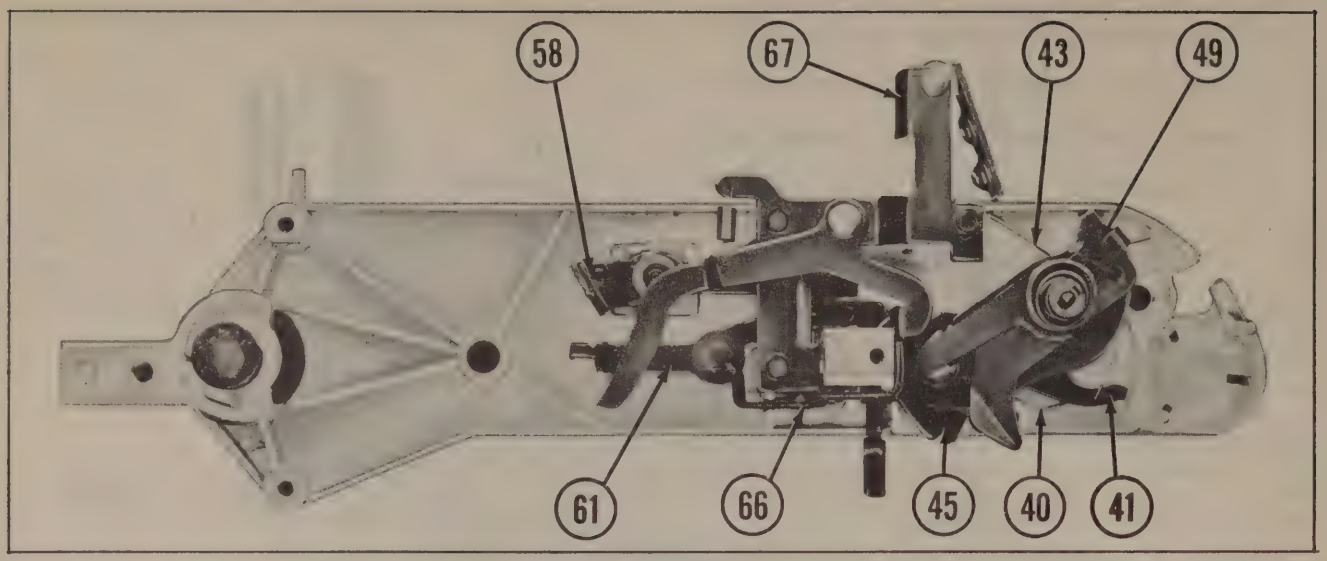

Figure 9

TROUBLE CHART

SYMPTOM	CAUSE	REMEDY
Turntable does not revolve when control is turned to "On".	1. No current at motor.	(a)Check that current is reaching AC leads of changer.
		(b)Check that switch is closing.
		(c)Check wiring and soldered terminals in the changer.
	2. Motor defective.	(a)Remove turntable to allow motor to operate without load. If current is reaching motor and drive spindle does not rotate, the motor is defective. Repair or replace.
	3. Motor idler wheel not engaging turntable rim.	If drive spindle is turning but turntable is not: (a)Check motor idler assembly to determine if it is free to contact the drive spindle and turntable rim. (b)Wipe off inside rim of the turntable (6) to remove flock, or if oily, clean the turntable rim and rubber tire of the idler wheel with naptha or alcohol.
	4. Motor not in detent completely.	Check speed change slide for freedom of operation.
Changer does not cycle when the control knob is turned to the "Rej".	1. The manual reject not actuating the trip.	(a)Turn the control knob (11) to the reject position, hold and see that the control shaft assembly (41) has moved the trip link (76) to the rear. This should actuate the trip pawl on the main gear (70) which will bring the spur on the trip pawl in contact with the hub gear on the turntable hub.
		(b)Check for binding of the pawl lever (73), the trip lever assembly (75) and the trip pawl. If binding occurs, clean out all foreign matter and check for freedom .
Control knob cannot be turned to "On" position.	1. Machine shut off during cycle.	Turn the turntable clockwise, by hand, until the control knob (11) is free.
Pickup arm strikes records on spindle when it raises, or pickup arm rest when it moves out.	1. Pickup arm height not adjusted properly.	(See instructions for adjusting pickup arm height under "Adjustments").

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SYMPTOM	CAUSE	REMEDY
Turntable speed too slow (refer to exploded view).	1. Binding in turntable bearing.	Check the turntable bearing for freedom. Hold the motor idler wheel out of engagement with the turntable and spin the turntable, by hand, to see if it turns readily and coasts for a long time. If binding occurs, remove turntable, clean off foreign matter, and lubricate with light mineral oil.
	2. Line voltage too low.	The line voltage should not be less than 105 volts or the turntable may be too slow.
Turntable stalls or slows down during cycle; refer to exploded view.	1. Motor idler not engaging turntable.	1. (See "Turntable Does Not Revolve When Control Knob is Turned to "On" Position").
	2. Binding in drive mechanism.	Hold idler away from turntable, or remove idler wheel. Cycle machine by turning turntable slowly by hand. The main gear should turn freely for the complete revolution without binding at any point. (a) If binding occurs, check for foreign matter in the gear teeth, a bent gear bearing, or bent spindle bushing. Straighten or replace. Clean lubricate.
	3. Binding between pick-up arm lift pin (19) and lift pin cam surface on slide and cam assembly.	Lift pin should ride freely on cam surface without binding.
	4. Motor weak.	When everything checks all right, but the changer still stalls in cycle, the motor may be weak.
	5. Grease on idler wheel.	1. Wipe off idler wheel rubber tire; inner rim of turntable and pulley tires with naptha or alcohol.
	6. Idler wheel tension spring weak.	Replace spring or bend motor tension spring anchor bracket to give desired tension.
Changer continues to cycle.	Reject mechanism binding.	(a) Make certain the trip link (76) is not frozen in the reject position. (b) Make certain the changer control lever (41) is not binding and that it actuates the trip link (76) when the changer control knob (11) is turned to reject. (c) Check for binding of trip pawl, trip lever (75) and pawl lever (73); these must be free to turn easily. (d) Check the changer control linkage, (28) and (41).
Noise during playing of record.	1. Motor rumble.	If a low-pitched rumbling sound comes from the loud speaker while a record is being played, check motor grommets to be sure the motor is freely suspended on them. The motor lead wires should have slack to allow the motor to float. Motor rumble may also come from an unbalanced motor rotor; in this case, replace the motor.
	2. Defective turntable bearings (8).	Defective turntable bearings can cause rumble. Check for foreign matter in the bearing, defective balls, binding between balls and ball retainer; rough surface on washers. Clean ball bearing, sleeve bearing, and washers; lubricate with light mineral oil.
	3. Defective motor idler wheel.	A rapid thumping sound while the motor is running may indicate a flat spot on the motor idler wheel. If this condition does not clear up after ten minutes of running time, remove the turntable and check the rubber tire on the id-

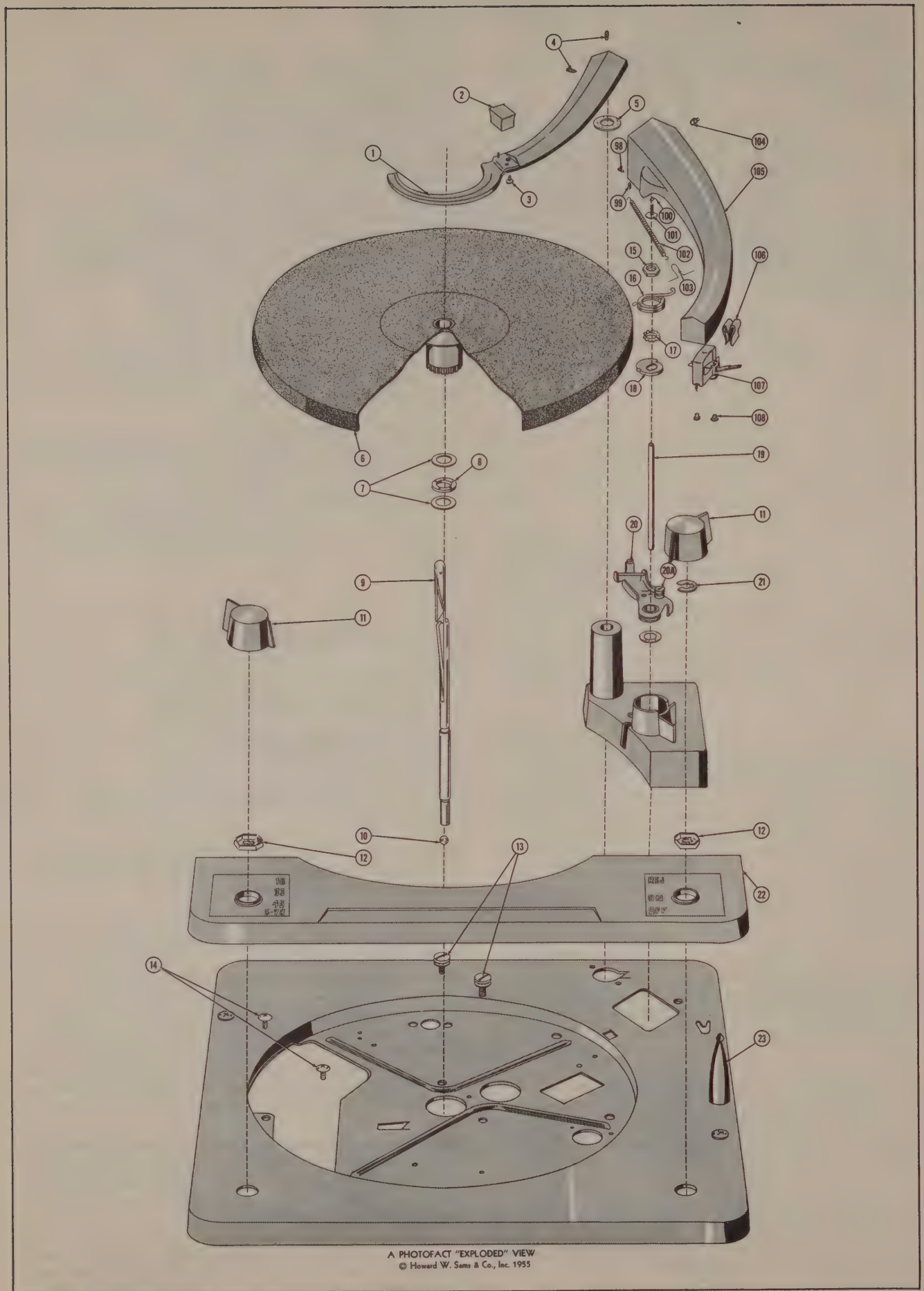

Figure 10A. Exploded View Of Parts Above Baseplate.

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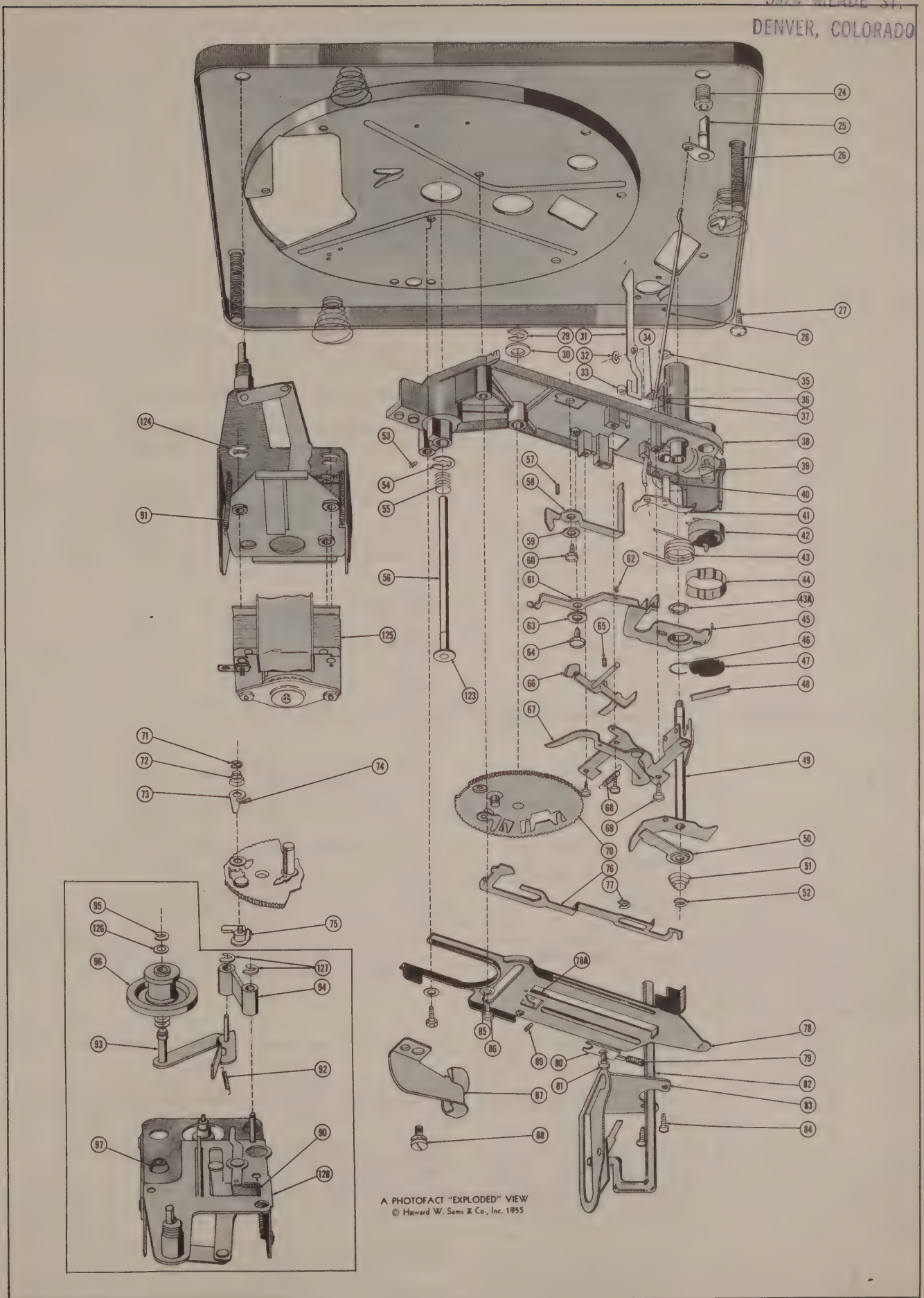

Figure 10B. Exploded View Of Parts Below Baseplate.

SYMPTOM	CAUSE	REMEDY
		ler. If the surface of the rubber tire is not smooth and even, replace the part. Should the bearing of the idler wheel show signs of excessive wear or be extremely wobbly, the idler wheel should be replaced.
	4. Defective record.	Worn or defective records cause needle scratch and distortion of the recorded sound. If the record is warped, it may slip on the other records causing "Wow" (a waver in the recorded sound). An enlarged hole in the record can also cause "Wow".
	5. Turntable scrapes.	If a scraping sound occurs as the turntable revolves, check: (a)Turntable warped, causing outer rim to rise and fall. (b)Motor idler or mounting plate bent.
	6. Squeaks.	Squeaking sound as changer operates indicates lack of oil. Lubricate points indicated under "Lubrication".
	7. 7" lever (58) loose.	Check 7" lever washer (59) and screw (60) to see if they are tight.
Distortion of recorded sound.	1. Defective record.	(See "Noise During Playing of Record").
	2. Defective amplifier.	Check phonograph amplifier and speaker.
	3. Bad Cartridge.	Replace.
	4. Bad Needle.	Replace.
No Sound During Playing.	1. Defective cartridge.	Replace.
	2. Defective wiring.	Check pickup leads for a shorted or open lead.
	3. Defective amplifier.	Check phonograph amplifier and speaker.
	4. Loose cartridge terminal clips.	Remove, squeeze together slightly, and replace.
Excessive record wear.	1. Binding on pickup arm.	(See "Needle Does Not Track Across Record Properly").
Changer does not shut off after last record has been played (refer to exploded view).	1. Record support binding (1).	The record support must drop below the off-set shoulder of the spindle or the changer will not shut off.
	2. Lever assembly binding (66).	Clean out dirt and make sure this operates smoothly.
	3. Shut-off bracket binding.	Check bracket and if bent, straighten.
	4. Shut off lever not engaging locator.	Adjust tab on slide that rotates the locator and trip finger when unit is cycling.
Rough pickup arm motion.	1. Horizontal defects.	(a)Check pickup arm return locator (45) for tightness. (b)Check that pickup arm return spring (43) is not weak and is hooked up properly. (c)Check that fiber washer (43A) is installed under pickup arm return locator.

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SYMPTOM	CAUSE	REMEDY
	2. Vertical defects.	(a)Lift pin (19) binding; clean out dirt and lubricate. (b)Slide and cam (78) binds; check bearing points--clean and lubricate. (c)Burrs in main slot in slide and cam (78)--remove with fine file. (d)Ejector lever on ejector bracket assembly (87) binding straighten, remove burrs, and lubricate. (e)Pickup arm shaft and sleeve binding; clean and lubricate.
Noise during change cycle.	1. Tines on the forked end of the slide and cam assembly (78) bent .	Replace.
	2. Lack of lubrication Grinding noise.	Lubricate ejector lever (87) where it contacts lower end of spindle (56).
Control knob does not detent on "33", "45", or "78" positions.	1. Detent spring off or broken.	Replace.
Cartridge drags on record.	Needle bent.	Replace needle.
	Cartridge mounting screws loose.	Tighten.
Shuts off when last record drops.	1. Shut-off bracket (83) bent.	Straighten or replace.
	2. Record support bent.	Bend down slightly so record support (1) is parallel with the base plate.
	3. Loose shut-off lever assembly (66).	Tighten.
Will not play manually.	1. Trip link (76) bent.	Straighten or replace.
	2. Trip finger cam (49) bent.	Straighten or replace.
Impossible to adjust set-down.	1. Pickup arm shaft and sleeve assembly (49) defective.	Shift the safety plate (18) toward the eccentric set-down adjusting screw (20A), and tighten pickup arm shaft and sleeve nut (15). Hold pickup arm against rear stop and push on trip finger cam (49). The safety plate (18) should move away from the set-down adjusting screw (20A) and snap back when the trip finger cam (49) is released; if it does not, replace the pickup arm shaft and sleeve assembly (49). Hinge pivot screws may be adjusted favoring one side or the other.
Record does not drop when changer cycles.	1. Spindle pusher shaft (56) broken, or bent.	Replace push shaft (56).
	2. Record finger in spindle not moving far enough to eject a record.	The record finger should move forward until it has reached a point flush with, or a maximum of , .010 beyond the spindle body (9). To insure that the record finger is all the way forward, push rod (56) should be raised high enough by the ejector lever to slightly compress the pusher spring (See "Turntable Stalls During Cycle"). If the spring is compressed and the record finger does not move far enough forward to eject a record, the spindle (9) should be replaced. If a

SYMPTOM	CAUSE	REMEDY
		record is not pushed completely off the ledge it may hang on the spindle momentarily, then drop on the pickup arm when it moves in over the turntable.
	3. Check that ball bearing(10) is not missing.	Replace.
Two records drop at once.	1. Hole in record too large.	Check the diameter of the hole in the record. An oversize hole will cause two records to drop at once.
	2. Spindle guide not fully down.	If the spindle guide is not all the way down, more than one record may be dropped at a time. (a)Check the guide to be sure it is free and does not bind at any point. Clean out foreign matter or straighten if necessary. Do not oil. (b)When records are placed on the spindle, be sure the guide is all the way down. The guide will normally raise as a record is being dropped, but it should return to place immediately, by gravity.
	3. Record pusher (56) defective.	The record pusher (56) may be deformed, etc. This may cause two records to drop at once. Replace with new pusher or replace spindle assembly.
	4. Slight play in spindle (9).	Tighten spindle set screw (53).
Record hits pickup arm (refer to exploded view).	1. Record finger not moving far enough forward to eject record.	(See "Record Does not drop when changer cycles").
	2. Record finger extending beyond outside diameter of spindle.	Cycle changer, by hand, until pusher shaft is at the top of its travel. Using new record as a gauge, pass it over the spindle to see if it binds at any point. File off high points on record finger with a fine file, until record will pass freely over spindle.
	3. Pickup arm not adjusted properly.	(See "Adjustments").
Needle does not set down on 10" record in proper position (refer to exploded view).	1. Pickup arm not adjusted properly.	(See "Adjustments"). (a)Loose nut (15) on pickup arm shaft and sleeve (49).
	2. Pickup arm shaft and sleeve (49) binding.	File off burrs and rough surfaces. Polish and lubricate shaft.
	3. 7" set-down lever (58) and 12" record selector (31) not operating properly.	Insure that the proper operation and reset of the 7" set-down lever (58) and 12" record selector (31) is not being interfered with.
	4. Needle bent.	Replace with new needle.
	5. Wire spring (37) broken.	12" record selector (31) does not cock; check for broken 12" record selector spring (37).
	6. Bent pickup arm return locator (45).	Straighten or replace.
	7. Bent trip finger cam (49).	Straighten or replace.

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TROUBLE CHART-Con't.

SYMPTOM	CAUSE	REMEDY
Needle does not set down on 12" record in proper position (refer to exploded view).	1. Diameter of 12" record undersize.	The set-down position of the needle for 12" records is determined by the edge of the record striking the 12" record selector (31). If a 12" record has a diameter of less than the standard size of 11-7/8" plus or minus 1/32", it may fail to depress the 12" record selector far enough.
	2. Enlarged center hole in record.	An enlarged center hole might fail to set the 12" record selector because it could produce the same effect as a small record.
	3. Pickup arm not adjusted properly.	(See "Adjustments") Page 7.
	4. Binding of pickup arm shaft and sleeve (49).	Clean and polish shaft (49) and lubricate with light oil.
	5. Reset lever spring (62) broken.	Replace spring (62).
	6. 12" record selector spring (37) broken.	Replace spring (37).
	7. 12" record selector (31) binding.	The 12" record selector must be free to operate smoothly. Clean out dirt and straighten if bent, or replace.
	8. Bent pickup arm return locator (45).	Straighten or replace.
	9. Bent trip finger cam (49).	Straighten or replace.
Needle does not set down on 7" record properly.	1. 7" set-down lever spring (57) broken or weak.	Replace.
	2. Pickup arm not adjusted properly.	(See Adjustments) Page 7.
	3. 7" set-down lever screw (60) loose.	Tighten.
	4. 7" set-down lever (58) hitting frame or baseplate where it goes through hole in frame.	Straighten or replace.
	5. Reset lever (61) bent.	Replace.

PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	6000	Record Support Assy.(Complete), Consists of:	15	3887	Jam Nut #1/4x28
			16	4937	Safety Spring
1		6932 Record Support	17	3888	Lockwasher
2		6864 Knob	18	4339	Safety Plate
3		6927 #4x1/4 Flat Head Screw	19	4327	Lift Pin
4		6928 Set Screws	20	4072	Hinge Arm Assembly
5	7470	Cork Washer	20A		Set-Down Adj. Screw (Part of Item 20)
6	6958-A	Turntable Assembly	21	1719	"C" Washer
7	6877	Bearing Washers	22	6920-C	Escutcheon
8	6876	Ball Bearing Retainer	23	5573-A31	Rest Post
9	6049	Spindle Shaft	24	6916	Control Bushing
10	6884	Ball Bearing	25	6936	Control Lever Assembly
11	6918-A10	Control Knob	26	6456	Mounting Bolt
12	2257	Pal Nut	27	2916	Screw (Rest Post Mtg.)
13	101	Screw 10-24x3/8 Sems B. H.	28	6919	Reject Rod
14	6929	Screw 8-32x3/16 B. H. M. S.	29	1719	"C" Washer-Main Gear Assy.

PARTS LIST-Con't.

Ref. No.	Part No.	Description
30	2221	Washer, Fibre
31	2957	12" Record Selector
32	1588	"C" Washer
33	2580	Rubber Bumper
34	4172	Compression Spring
35	1652	"C" Washer
36	1720	Speed Nut
37	2563	Spring-12" Record Selector
38	6968	Die-Cast Frame
39	101	Screw-#10-24x5/16
40	3901	Reject Spring
41	2284	Control Shaft Assembly
42	467	Switch
43	4938	Return Spring-Pick-up Arm
44	2931	Fibre Insulating Strip
45	6405	Locator and Bushing Assembly
46	5828	Retainer Ring-Locator Plate
47	2573	Switch Cover
48	4212	Retainer-Switch Cover
49	6892	Trip Finger Cam and Shaft Assy.
50	6879	Retard Lever
51	6882	Lift Pin Spring
52	1588	"C" Washer
53	6955	Set Screw-#8-32x1/4
54	5022	"C" Washer
55	6885	Safety Spring
56	6874	Push Rod
57	2579	Spring-7" Set-Down Lever
58	2581	7" Set-Down Lever
59	2274	Flat Washer-7" Set-Down Lever
60	4856	Screw-#6-32x1/4
61	6007	Reset Lever
62	2925	Spring-Reset Lever
63	492	Flat Washer-Reset Lever
64	4856	Screw-#6-32x1/4
65	2579	Spring-Shut-Off Lever
66	6966	Shut-Off Lever Assy.
67	6890	Muting Switch Bracket Assy.
68	6880	Spring-Retard Arm
69	6713	Screw-#4-40Hex. Hd.
70	6967	Gear Assembly
71	1588	"C" Washer
72	4172	Spring
73	5339	Pawl Lever
74	5338	Pawl Spring
75	2569	Trip Lever Assembly
76	4656	Trip Link
77	1588	"C" Washer
78	6970	Slide Assembly
79	2246	Spring-Slide Bearing
80	2211	Slide Bearing
81	4856	Screw-#6-32x1/2
82	6897	Record Support Shaft
83	6931	Record Support Guide Assy.
84	4857	Screw-#6-32x3/8
85	2274	Flat Washer
86	4856	Screw-#6-32x1/4
87	6953	Ejector-Bracket Assembly
88	101	Screw-#10-24x5/16
89	2585	Spring-Escape Lever
	6950	Motor Assembly Complete, 110V. -60C. -2Pole, Consists Of:
90		6947 Detent Spring
91		6948 Counter Balance Spring
92		6949 Idler Spring
93		6937 Idler Arm Assembly
94		6901 Idler Link
95		1652 "C" Washer
96		9092 Idler Pulley
97		6631 Motor Mtg. Grommet
	6019	Motor Assy. Complete, 110V. -60C. -4Pole 2 Coil, Consists Of:
		9033 Idler Mtg. Bracket Assy.
		6901 Idler Link
		9330 Idler Tension Spring
		6948 Counter Balance Spring
		6947 Detent Spring
		2773 Grommets
		9032 Idler Pulley
	7505	Tone Arm and Hinge Assy., Consists of:
98		4923 Pivot Screw
99		6001 Pivot Lock Screw
100		7634 Lock Spring
101		7635 Lift Screw
102		6924 Hinge Spring
103		6965 Weight Adj. Spring
104		4922 Hinge Pivot Button
105		7884A Tone Arm
106		6963 Tone Arm Clip
107		7477 Cartridge (Sonotone 9980)
108		9074 Screw-#2-56x1/8 Phillips Fillister Hd.
	7500	Tone Arm and Hinge Assy., Consists Of:
		9194 Knob Screw
		7635 Lift Screw
		4072 Hinge Arm Assy.
		4922 Hinge Pivot Button
		4923 Pivot Screw
		6001 Pivot Lock Screw
		6862-A-33 Turnover Knob
		6865 Tone Arm
		6866 Detent Spring
		7463 Cartridge (Shure PC-44)
		7634 Lock Spring
		6924 Hinge Spring
		6963 Tone Arm Clip
		6965 Adjusting Spring
	7952	Tone Arm and Hinge Assy., Consists Of:
		9193 Cartridge Screw-3-48x5/16
		4072 Hinge Arm Assy.
		3512 Cartridge (G. E.)
		4922 Hinge Pivot Button
		4923 Pivot Screw
		6001 Pivot Lock Screw
		9031 Cartridge Knob
		6643 Hinge Spring
		6963 Tone Arm Clip
		6965 Adjusting Spring
		7634 Lock Spring
		7635 Lift Screw
		7459 Tone Arm
	6100	45 RPM Spindle-New Type Consists of
109		6104-A4 Spindle Cap
110		6097 Spindle Clamp
111		6089 Separator Blade
112		6093 Bolt Return Spring
113		6102 Actuator Lever Assy.
114		6088 Bolt
115		6093 Bolt Return Spring
116		6087 Spindle Body
117		5245 Screw, 4-40x7/8Fil.Hd.M.S.
118		6094 Fibre Washer
119		6096 Rotor
120		5068 Spring-Rotor Lift
121		6095 Rotor Lift
122		6099 Retainer
123	6883	Thrust Washer
124	5022	"C" Washer
125	6945	Motor
126	2583	Fiber Washer
127	1652	"C" Washer
128	6944	Motor Plate Assy.

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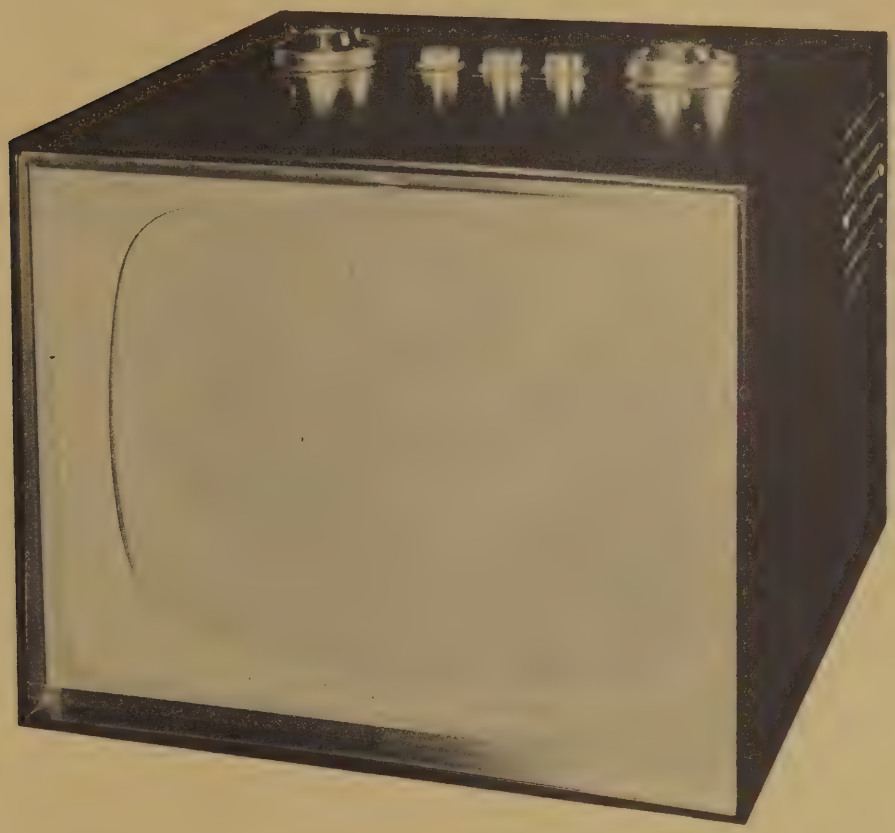

MODEL H-908T17(V)

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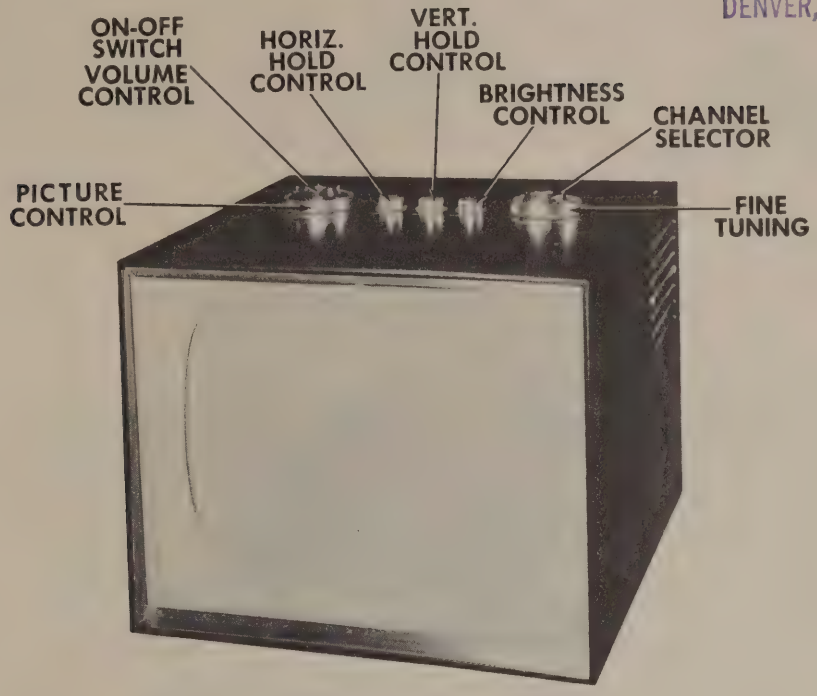

WESTINGHOUSE MODEL H-908T17(V)

TRADE NAME	Westinghouse	MODELS	CHASSIS	TUNER
		H-892T17(V), H-894T17(V), H-908T17(V), H-909T17(V), H-910T17(V)	V-2316-11	V-15560-1 (VHF)
		H-892T17(S), H-894T17(S), H-908T17(S), H-909T17(S), H-910T17(S)	V-2316-12	V-15510-1(VHF)
		H-896T21(V), H-898T21(V), H-899T21(V), H-900C21(V), H-901C21(V), H-902K21(V), H-903K21(V), H-904K21(V), H-905K21(V), H-912T21(V), H-913T21(V), H-914T21(V)	V-2317-61	V-15560-1(VHF)
		H-896T21(S), H-898T21(S), H-899T21(S), H-900C21(S), H-901C21(S), H-902K21(S), H-903K21(S), H-904K21(S), H-905K21(S), H-912T21(S), H-913T21(S), H-914T21(S)	V-2317-62	V-15510-1 (VHF)
		H-892TU17, H-894TU17, H-908TU17, H-909TU17, H-910TU17	V-2326-101	V-15310-1 (VHF-UHF)
		H-896TU21, H-898TU21, H-899TU21, H-900CU21, H-901CU21, H-902KU21, H-903KU21, H-904KU21, H-905KU21, H-912TU21, H-913TU21, H-914TU21	V-2327-601	V-15310-1 (VHF-UHF)

MANUFACTURER	Westinghouse Electric Corp., Television & Radio Div., Metuchen, N.J.
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.4 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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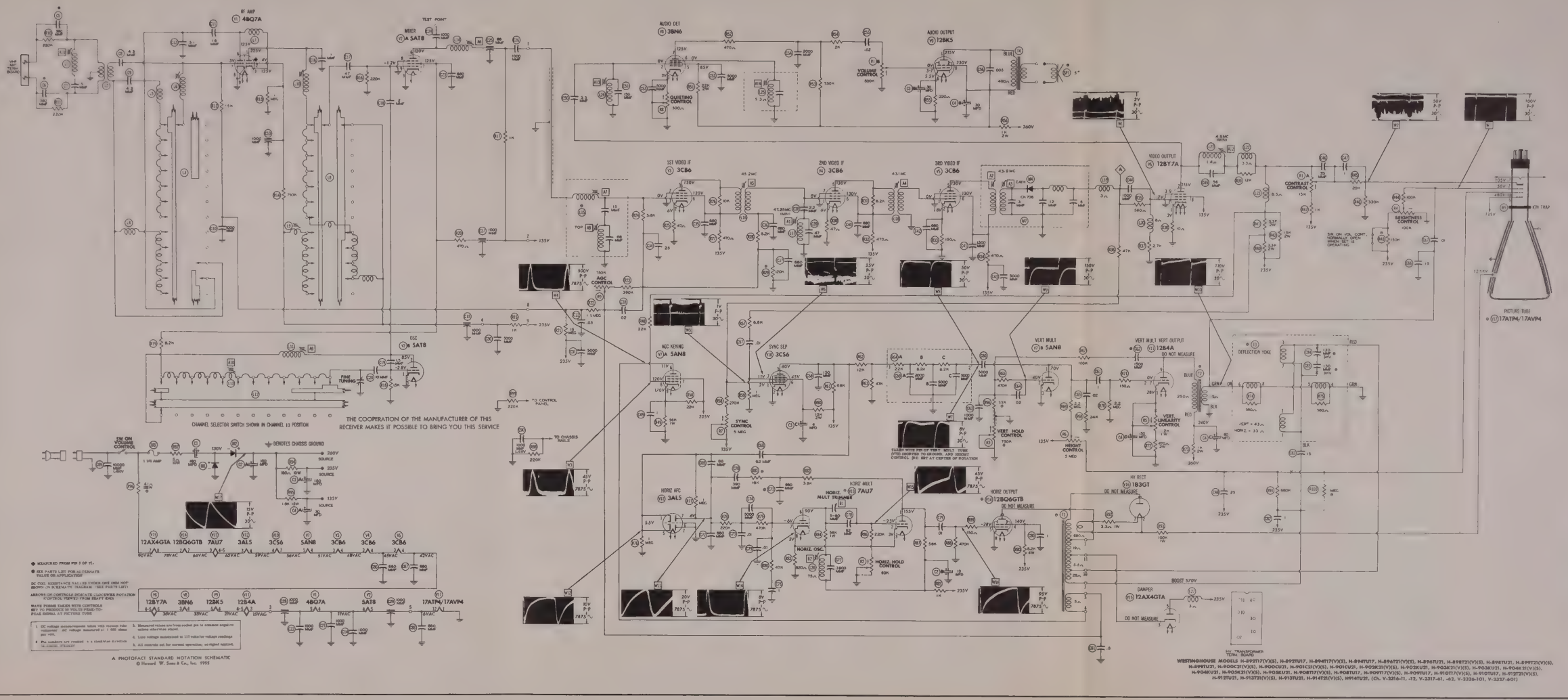

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CHASSIS TOP VIEW

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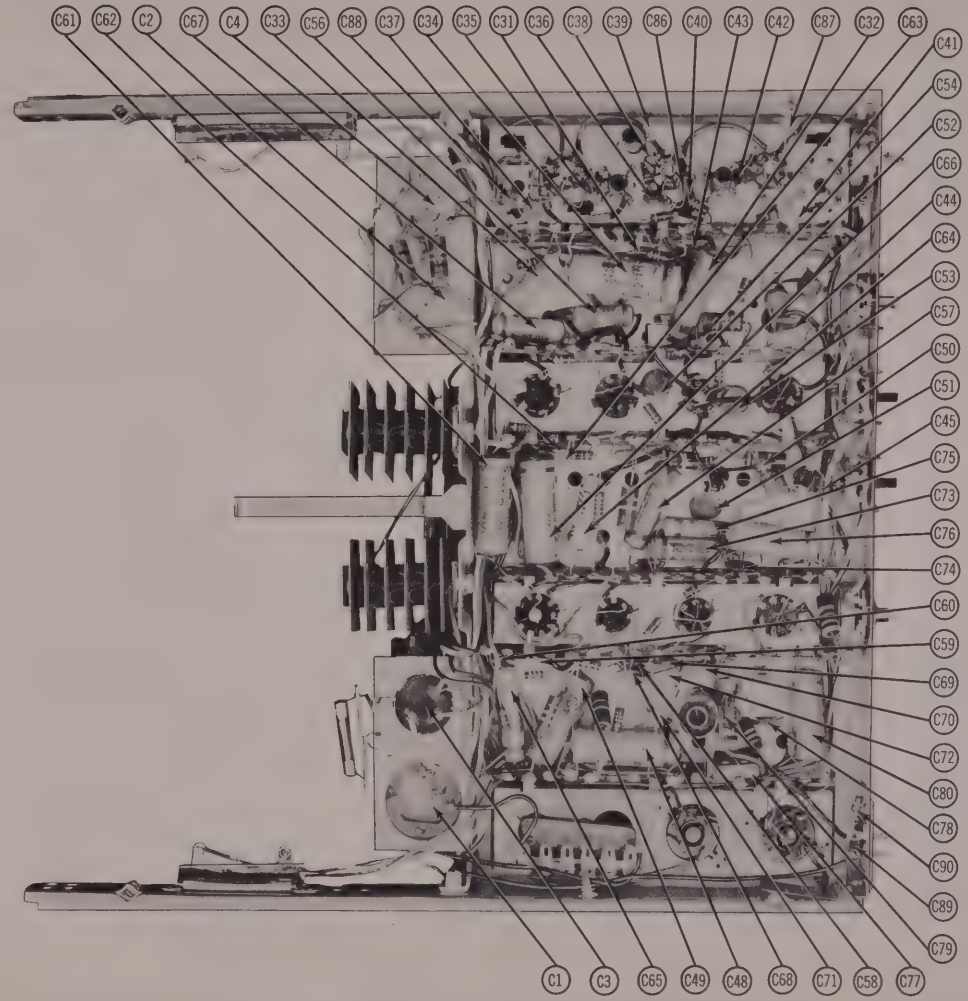

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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H-89-1010(V)(S), H-89-1012(V)(S), H-89-1013(V)(S), H-89-1014(V)(S), H-89-1015(V)(S), H-89-1016(V)(S), H-89-1017(V)(S), H-89-1018(V)(S), H-89-1019(V)(S), H-89-1020(V)(S), H-89-1021(V)(S), H-89-1022(V)(S), H-89-1023(V)(S), H-89-1024(V)(S), H-89-1025(V)(S), H-89-1026(V)(S), H-89-1027(V)(S), H-89-1028(V)(S), H-89-1029(V)(S), H-89-1030(V)(S), H-89-1031(V)(S), H-89-1032(V)(S), H-89-1033(V)(S), H-89-1034(V)(S), H-89-1035(V)(S), H-89-1036(V)(S), H-89-1037(V)(S), H-89-1038(V)(S), H-89-1039(V)(S), H-89-1040(V)(S), H-89-1041(V)(S), H-89-1042(V)(S), H-89-1043(V)(S), H-89-1044(V)(S), H-89-1045(V)(S), H-89-1046(V)(S), H-89-1047(V)(S), H-89-1048(V)(S), H-89-1049(V)(S), H-89-1050(V)(S), H-89-1051(V)(S),

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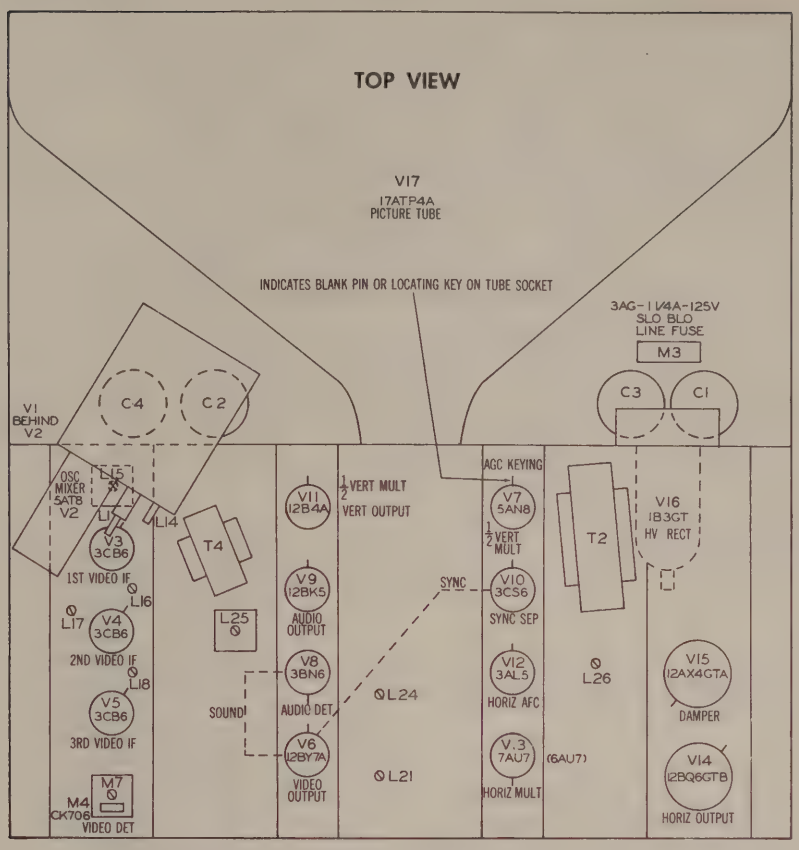
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

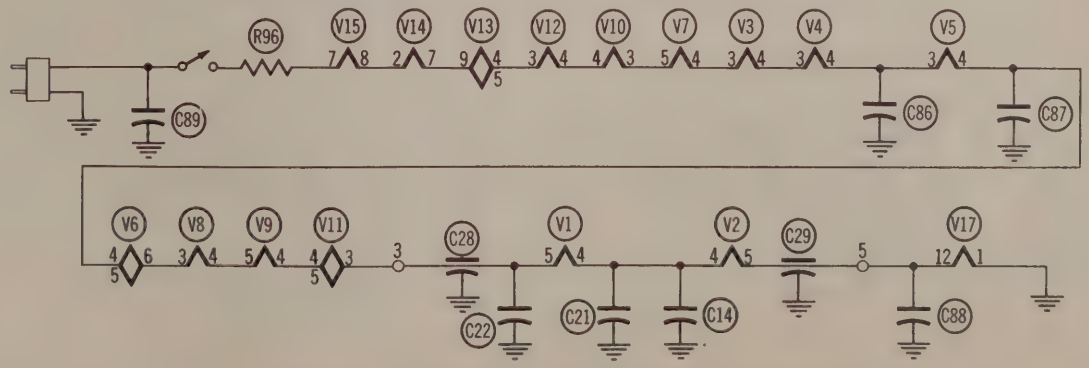
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V17
Has pic, no sound - V8, V9
Overloaded picture - V7

SYNC FAILURE
No vert. sync - V7, V10, V11
No horiz. sync - V10, V12, V13
No vert. or horiz. sync - V10

SWEEP FAILURE
No raster, has sound - V13, V14, V15, V16, V17
No vertical deflection - V7, V11
Poor vert. linearity or foldover - V7, V11
Poor horiz. linearity or foldover -V13, V14, V15
Narrow picture - V13, V14, V15, V16, M1, M2
Vert. off freq. - V7, V10, V11
Horiz. off freq. - V10, V12, V13

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 9 volt bias supply to the ungrounded side of C81. Connect the positive lead to chassis.
Connect a 470MMF capacitor across the oscilloscope vertical input terminals.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 3CB6 (V3). Low side to chassis.	Not used	47.25MC (Unmod)	Any non-interfering channel	Use VTVM. DC probe to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	"	43.9MC	"	"	A2, A3	Attenuate generator output for not more than 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	"	43.1MC	"	"	A4	"
4.	"	"	"	45.2MC	"	"	A5	"
5.	Fig.2	Thru matching network (Fig.2) to antenna terminals.	213MC (10MC Swp)	41.25MC 42.25MC 43.0MC 45.0MC 45.75MC 47.25MC	13	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A6, A7, A8	Use high scope gain and only enough sweep generator output for usable pattern on scope. Clip high side of marker generator to converter (ungrounded) tube shield. Leave low side disconnected. Set fine tuning control to its mid-range position. Adjust A6 for correct overall bandpass (Fig.1). Adjust A7 for correct tilt. Adjust A8 for MINIMUM marker amplitude at 41.25MC as in Fig. 1. If necessary SLIGHTLY retouch A2 thru A5 for symmetrical response similar to Fig.1 If difficult to obtain proper response by adjustments of A7 and A8, connect a 33MMF capacitor in series with input lead to L15. In later models addition of a 33MMF capacitor is not necessary. L15 was replaced to part #V-15066-2.
6.	Fig. 2.	Thru matching network (Fig.2) across antenna terminals.	213MC (10MC Swp)	211.25MC	13	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A9	If sweep generator has no built-in marker, connect separate marker generator loosely to antenna terminals. Adjust to place video marker (211.25MC) at 50% on high side of response curve.
7.	"	"	85MC (10MCSwp)	83.25MC	6	"	A10	Adjust to place video marker (83.25MC) at 50% on high side of response curve.

40-48MC IF TRAP ADJUSTMENT

The IF trap has been preset at the factory at approximately 44MC. It is for the purpose of eliminating any IF interference from nearby transmitters operating in the 40MC band. If interference is noted, turn to channel 2 and adjust the IF trap (A-11) to minimize the interference.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe thru detector (Fig.3) to pin 11 (cathode) of picture tube. Low side to chassis.	A12	Use strong signal from generator. Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (15KC Swp)	4.5MC	Any unused channel	Vert. Amp. across volume control (R1B). Low side to chassis.	A14	Use strong signal from generator. Adjust A14 for maximum response at 4.5MC.
10.	"	"	"	"	"	"	A13, A14	Attenuate generator to give MINIMUM useful indication on scope. Adjust A13, A14 for maximum output.
11.	"	"	Not used	4.5MC (30% 400∿ Mod)	"	"	R8	Starting with a very low signal input gradually increase the level, at the same time turning the quieting control (R8) back and forth until the signal level reaches the point where the AM output reaches the point where the output on the scope dips to zero with a peak on each side. Set R8 for zero output at this signal level.

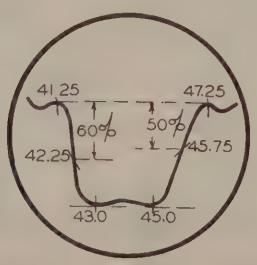


FIG. 1

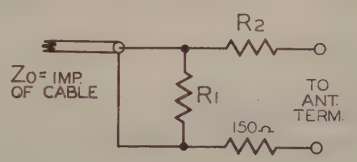


FIG.2

Z0	R1	R2
50Ω	56Ω	120Ω
75Ω	82Ω	110Ω

ALIGNMENT INSTRUCTIONS (cont)

SOUND IF ALIGNMENT USING A TV SIGNAL

Tune in a TV station and connect an attenuator between the antenna and the receiver.
Set the quieting control (R8) to its mid-range position.
Adjust the quadrature coil (A14) for maximum sound. If two widely spaced peaks occur use the one with the slug farthest counter clockwise.
If two closely spaced peaks occur, either the signal is not strong enough or the quieting control is not set properly.
Reduce the signal to its lowest usable level and adjust A13 and A14 for maximum sound.
Apply a weak signal that allows noise to be heard in the speaker.
Adjust the quieting control (R8) for minimum noise. The point of minimum noise depends on the strength of the signal, therefore, the weakest possible signal should be used.
Do not leave R8 at its maximum counter clockwise position.

ALIGNMENT FOR TUNER V-15560-1

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

ALIGNMENT FOR TUNER V-15310-1 (VHF-UHF COMBINATION)

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

RF AND MIXER ALIGNMENT FOR TUNER V-15510-1

Disconnect the white wire (AGC buss) from tuner terminal. Connect the negative side of 1.5 volt battery to this terminal.
Connect the positive lead to chassis.
The series resonant trap (A30) should be adjusted in the field. whenever local interference on channel 2 is encountered.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Fig. 2	Thru matching network (Fig. 2) across antenna terminals.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A15, A16, A17	Adjust for response similar to Fig. 4 with markers above 90%.
13.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel, make compromise adjustment of A15, A16 and A17 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

OSCILLATOR ALIGNMENT FOR TUNER V-15510-1

The channel oscillator adjustments are reached thru a hole just above the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect bias as under "RF and Mixer Alignment For V-15510-1 Tuner".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.
Connect a 470MMF capacitor across vertical input terminals of the scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Fig. 2	Thru matching network (Fig. 2) across antenna terminal.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A18	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%. Restore tuner AGC lead to its original connection.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A19	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A20	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A21	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A22	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A23	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A24	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A25	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A26	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A27	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A28	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A29	

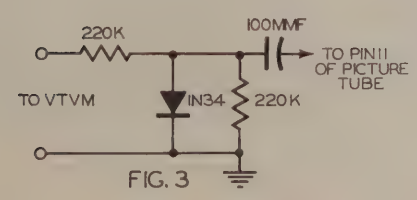


FIG. 3

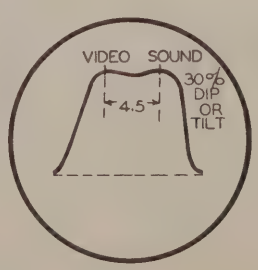


FIG. 4

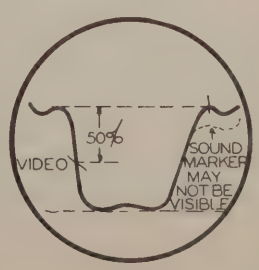


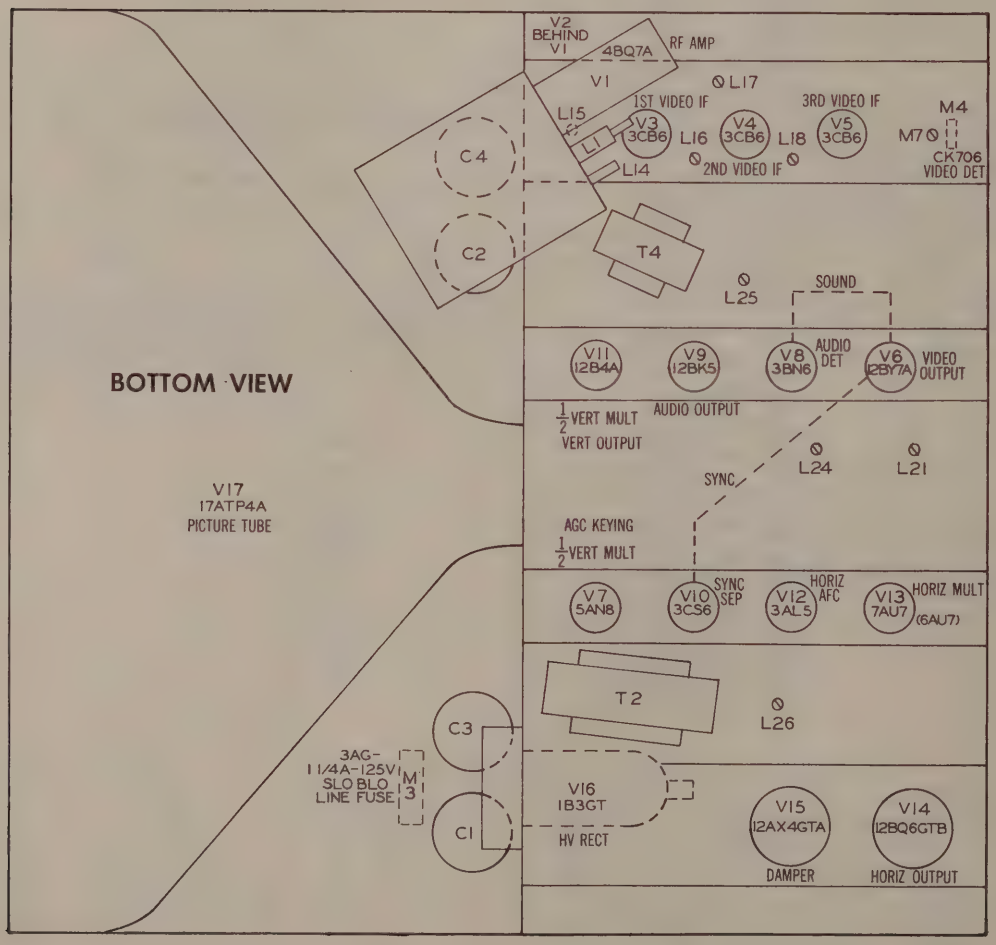
FIG. 5

PROPERTY OF
DENVER, COLORADO

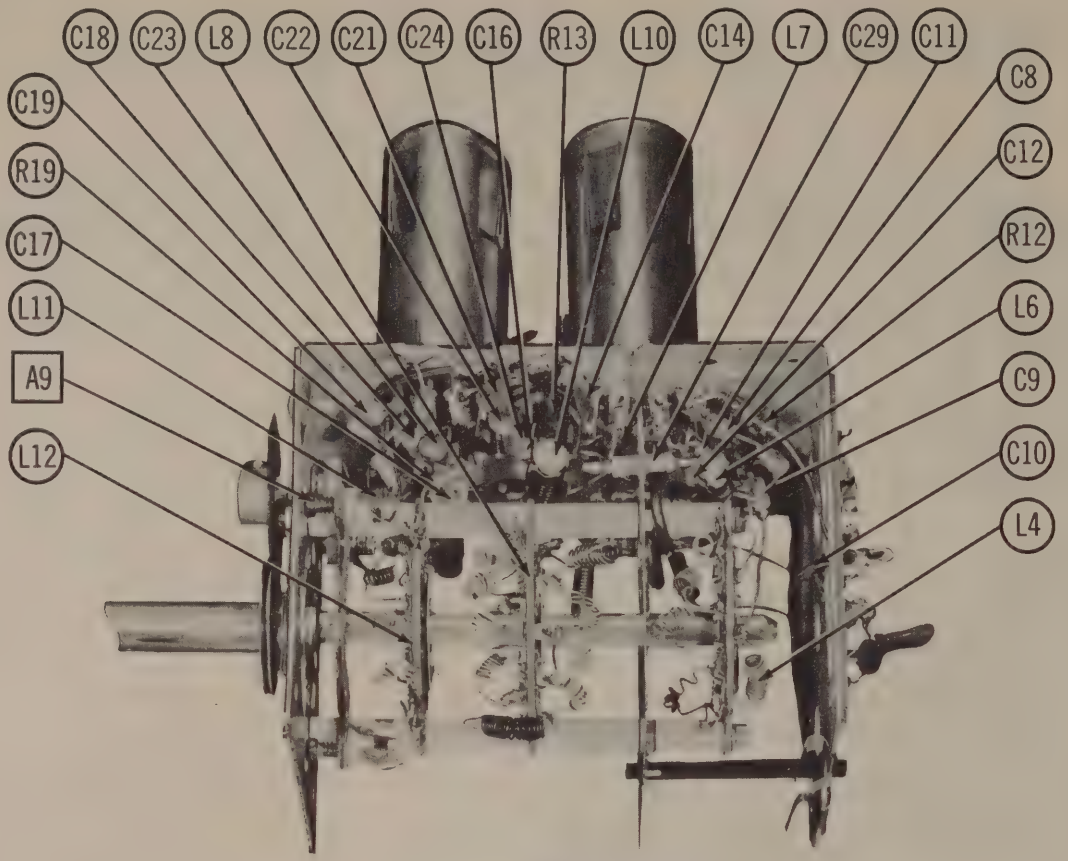
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	4BQ7A	†1. 2KΩ	450KΩ	Inf.	3Ω	4Ω	Inf.	1. 8Meg	0Ω	0Ω
V 2	5AT8	15KΩ	†10. 5KΩ	0Ω	3Ω	2Ω	†2. 8KΩ	†2. 3KΩ	0Ω	220KΩ
V 3	3CB6	120KΩ	47Ω	13Ω	12Ω	†2. 3KΩ	†2. 3KΩ	0Ω		
V 4	3CB6	120KΩ	47Ω	12Ω	11Ω	†2. 3KΩ	†2. 3KΩ	0Ω		
V 5	3CB6	0Ω	150Ω	11Ω	10Ω	†2. 3KΩ	†2. 3KΩ	0Ω		
V 6	12BY7A	10Ω	2. 7KΩ	0Ω	10Ω	10Ω	9Ω	†3. 7KΩ	†18KΩ	0Ω
V 7	5AN8	▲4. 5Meg	1. 2Meg	0Ω	13Ω	14Ω	550KΩ	†180Ω	†26KΩ	†16KΩ
V 8	3BN6	300Ω	. 5Ω	9Ω	8Ω	†23KΩ	5. 3Ω	†330KΩ		
V 9	12BK5	†1. 6KΩ	TP	300KΩ	5Ω	8Ω	220Ω	300KΩ	†1KΩ	NC
V 10	3CS6	50KΩ	0Ω	14Ω	15Ω	†40KΩ	†10KΩ	1Meg		
V 11	12B4A	1. 2KΩ	2. 2Meg	4Ω	5Ω	5Ω	NC	2. 2Meg	NC	†1. 3KΩ
V 12	3AL5	1Meg	0Ω	16Ω	15Ω	1Meg	0Ω	2Meg		
V 13	7AU7	†57KΩ	230KΩ	820Ω	16Ω	16Ω	†57KΩ	2. 7Meg	820Ω	17Ω
V 14	12BQ6GTB	NC	19Ω	TP	†8. 4KΩ	470KΩ	NC	17Ω	0Ω	TOP CAP 19Ω
V 15	12AX4GTA	NC	NC	5Meg	NC	†185Ω	NC	22Ω	19Ω	
V 16	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲700Ω
V 17	17ATP4A	0Ω	†160KΩ	PIN 6 †1. 8KΩ	PIN 10 ▲680KΩ	PIN 11 †100KΩ	PIN 12 2Ω			

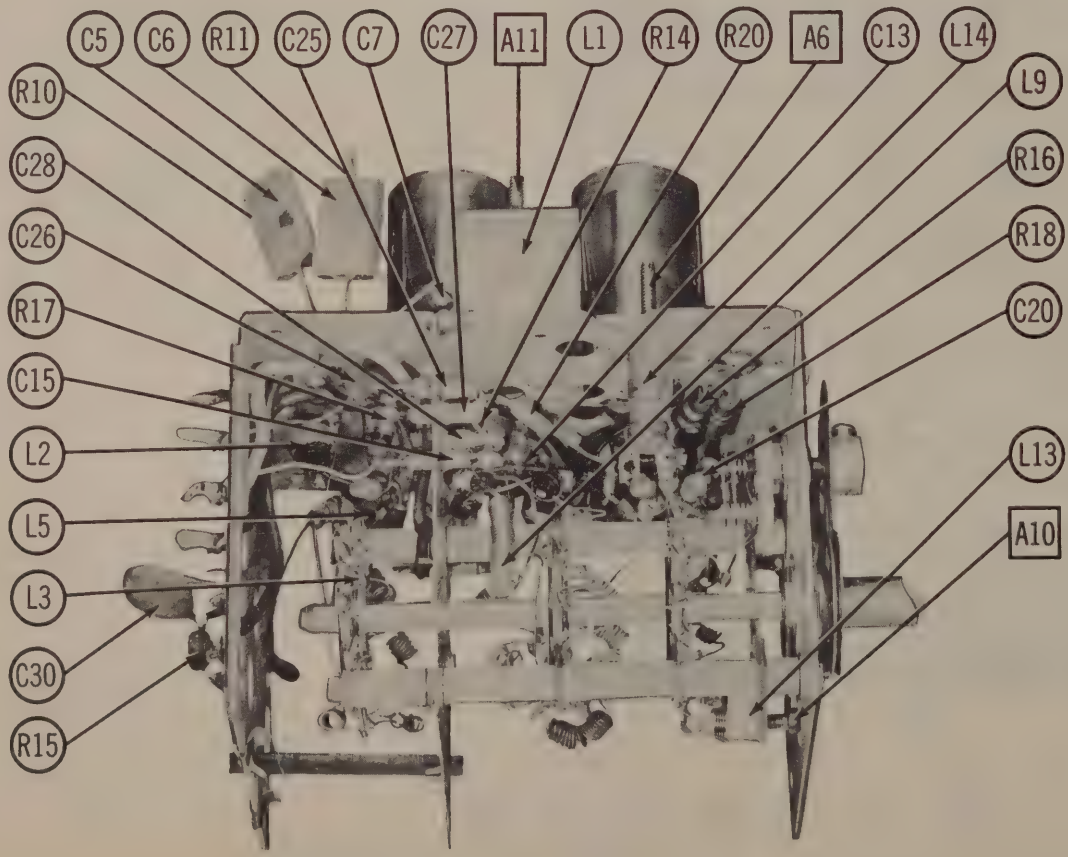
†MEASURED FROM OUTPUT OF M2.
▲MEASURED FROM PIN 3 OF V15.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

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3924 MEADE ST.
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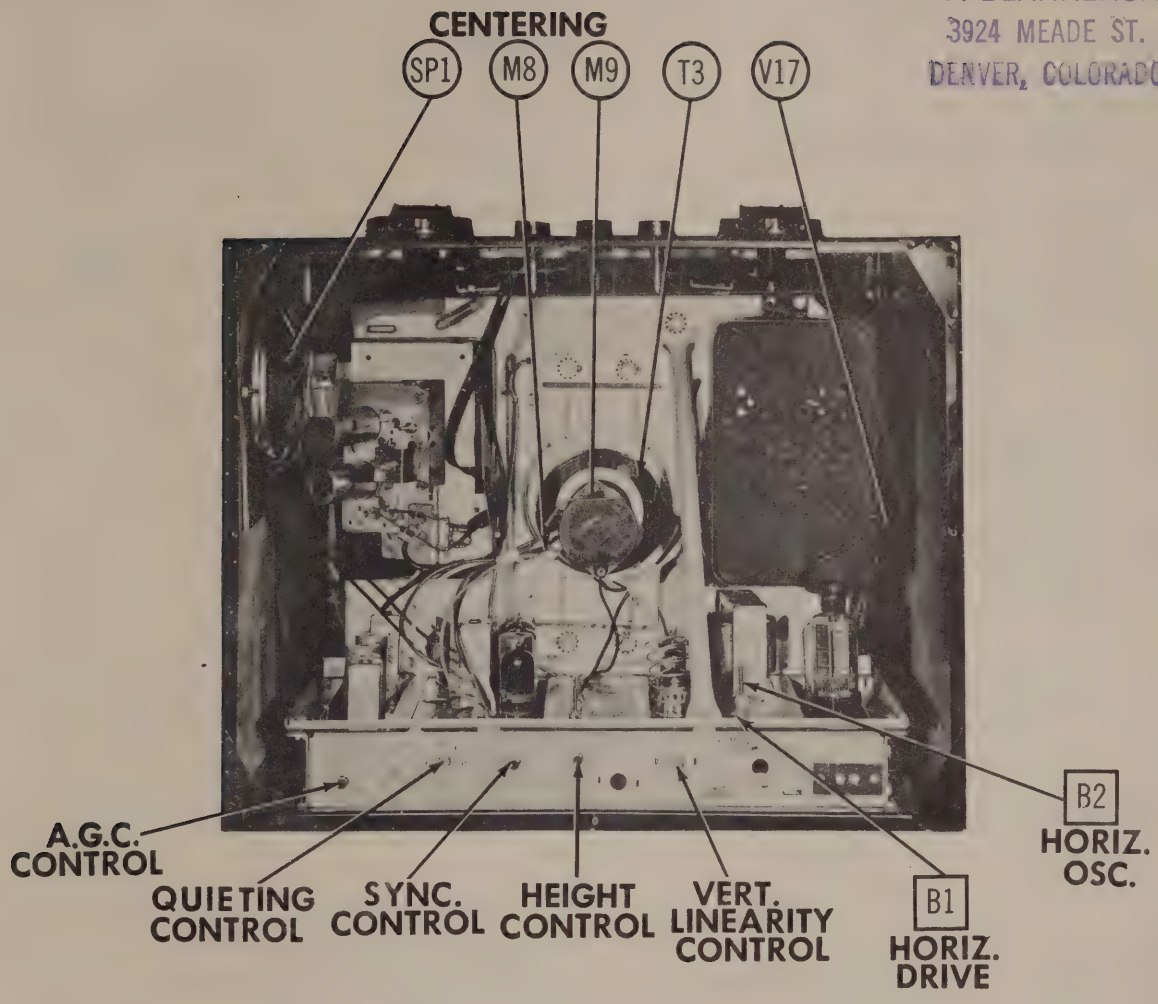

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control (R2) to its mid-range position.

Connect a short across the horizontal oscillator coil (L26). Connect the DC probe of a VTVM to pin 7 (grid) of 7AU7(V13). Common to chassis.

Adjust the horizontal multivibrator trimmer (B1) for zero volts on VTVM. If necessary, turn the horizontal hold control slightly to obtain zero reading.

Remove jumper from L26 and adjust the horizontal oscillator slug (B2) for zero reading on VTVM. Switch off channel and back again. Picture should immediately pull into sync.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage."

INSUFFICIENT SWEEP

Check by substitution V14 and V15. Check M1 and M2. Check T1, T3A, C79, R90, R97 and other associated components.

DRIVE LINES

Check by substitution V14 and V15. Check T1, T3A, C79, C1, R97, R90 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V14 and V15. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines."

PIE CRUST EFFECT

Check by substitution V13, V14 and V15. Check C75 for open. Check L26, C76, C74, R79, R86 and other associated components.

XMAS TREE EFFECT

Check by substitution V13, V14, and V15. Check T1 and T3 for internal arcing. Check L26, C77, C69, C72, R77, R81 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V7 and V11. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T2, T3B, R73, R72 and other associated components.	Check R6, R91, R69, C61 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V7 and V11. Check height and vertical linearity controls for proper operation. Check R69, T2 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V7 and V11. Check R6, R69, C61 and other associated components.

COMPRESSED AT TOP

Check by substitution V7 and V11. Check R72, R5, T2 and other associated components.

FOLDS

Check by substitution V7 and V11. Check C65, C69, R68, T2, T3B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V10. Check C57, C58, R60, R61, R62 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V7. Check vertical integrator network. Check R3, C63, C69, R66 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V12 and V13. Check C68, C73, C74, C75, R79, R86, R84 and other associated components.

HORIZONTAL BENDING

Check by substitution V10, V12 and V13. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check R42, R40, R41, L23, C44, C46, C47 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A12. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check C44, C47, L22, R39, R45, R47 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check C44, C47, L19, L22, R39 and other associated components.

SMEAR

Substitute V6, Check L19, L20, L22, L23, C44, C47 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8 and V9. Check stage V9 using audio signal generator. Apply audio signal across R18.

If Satisfactory	If Unsatisfactory
Check stage V8 for component failure or change of value.	Check C54, C55, C56, R52, R53, R55, R56, T4, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A14 and R8 for minimum buzz. If still unsatisfactory, check audio and video IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound."

POWER

DEAD SET

If filaments fail to light, check all tubes. These tubes are connected in series. Check AC interlock assembly. Check switch on volume control and R96. If filaments light, check M1, M2, R97 and C1. Check B+ filter and decoupling network. Check M3 fuse.

SMALL AND/ON DIM PICTURE

Check M1, M2, C1 and R97. Check B+ filter and decoupling network.

PROPERTY OF
L. F. HLANKENSHIP
3[illegible] MEADE ST.
DENVER, COLORADO

ALTERNATE TUNER SCHEMATIC

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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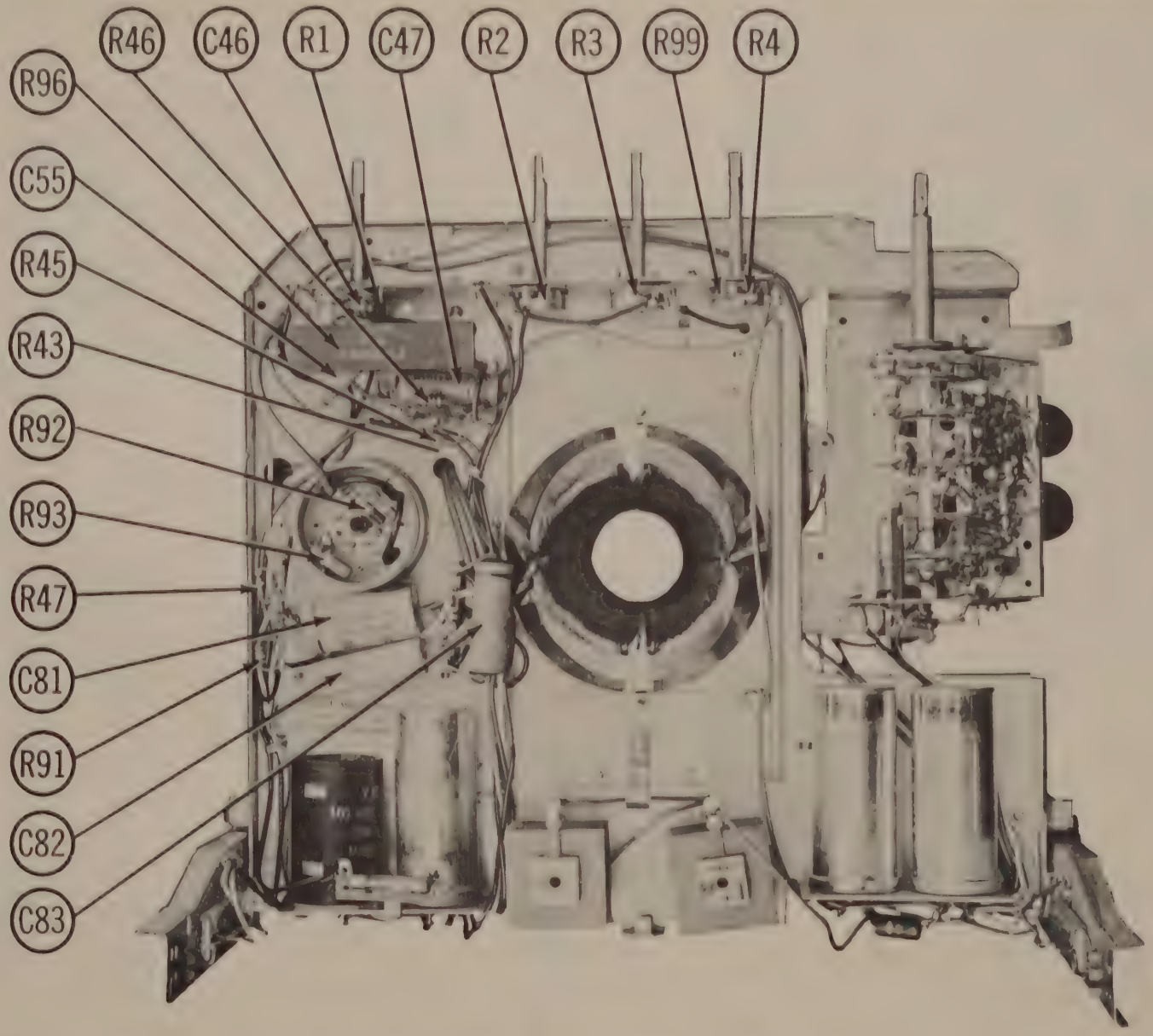
UHF - VHF TUNER V-15310-1 USED WITH CHASSIS V-2326-101, AND V-2327-601

CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION



VERTICAL SUB - CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	4BQ7A	4BQ7A	9AJ	
V2	Mixer-Osc.	5AT8	5AT8	9DW	
V3	1st Video IF Amp.	3CB6	3CB6	7CM	
V4	2nd Video IF Amp.	3CB6	3CB6	7CM	
V5	3rd Video IF Amp.	3CB6	3CB6	7CM	
V6	Video Output	12BY7A	12BY7A	9BF	
V7	AGC Keying-Vert. Mult.	5AN8	5AN8	9DA	
V8	Audio Det.	3BN6	3BN6	7DF	
V9	Audio Output	12BK5	12BK5	9BQ	
V10	Sync Sep.	3CS6	3CS6	7CH	
V11	Vert. Mult. - Vert. Output	12B4A	12B4A	9AG	
V12	Horiz. AFC	3AL5	3AL5	6BT	
V13	Horiz. Mult.	7AU7	7AU7	9A	Use 6AU7 as alternate.
V14	Horiz. Output	12BQ6GTB	12BQ6GTB	9AM	On chassis V-2316-11, -12 & V-2326-101, use 12BQ6GA, 12BQ6GT, 12BQ6GTA. On chassis V-2317-61, -62 & V-2327-601, use 12BQ6GA, 12BQ6GT, 12BQ6GTA or 12CU6.
V15	Damper	12AX4GTA	12AX4GTA	4CG	
V16	HV Rect.	1B3GT	1B3GT	8C	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Westinghouse PART No	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V17	17ATP4 [1] 17AVP4					12L	1 Aluminized
		17AVP4		17AVP4		12L	2 Silver Screen
		17AVP4A [2]		17AVP4A [2]		12L	
	21ALP4A [1]	21ALP4A [1]	21ALP4A [1]	21ALP4A [2]	21ALP4A [1]	12L	
		21ALP4	21ALP4	21ALP4	21ALP4	12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	160	200	V-15329-1				TM-D80-300	S-300	
C2A	▲160	350	V-15328-1				TM-3002	Q-002	
B	▲10	350						MT-9612	
C3A	▲150	350	V-15326-1				TM-3138	Q-200	
B	▲30	50						MT-9626	
C	■4	350							
C4A	▲30	350	V-15327-1			FP401.6	TM-4131	Q-200	
B	■30	350				TC65		MT-4620	
C	▲60	350							
D	150	50							
C5	390	500	RCM20B391K	D6-391	GP2K-391	MC243		K-1239	Note 1
C6	390	500	RCM20B391K	D6-391	GP2K-391	MC243		K-1239	Note 1
C7	5.1								
C8	4.3								
C9	4.3								
C10	1000			DD-102	801-001	DC-521			
C11	1.6								
C12	5.1								
C13	1000			MFT-1000					
C14	1000			DD-102	801-001	DC-521			
C15	1000			MFT-1000					
C16	1			TCZ-1	NP0A-010				
C17	47			D6-470	GP1K-470	UC-5447			
C18	2			TCZ-2R2	NP0A-2R2				
C19	5.6								
C20	10			TCZ-10	NP0A-100	ZT-541			
C21	1000			DD-102	801-001	DC-521			
C22	1000			DD-102	801-001	DC-521			
C23	680			D6-681	GP2K-681	UC-5368			
C24	1000			DD-102	801-001	DC-521			
C25	68								
C26	1000			DD-102	801-001	DC-521			
C27	1000			MFT-1000					
C28	1000			MFT-1000					
C29	1000			MFT-1000					
C30	5000		R2CC62Z5Z502P	DD-502	811-005	DC-525		C-1250	
C31	5000		R2CC62Z5Z502P	DD-502	811-005	DC-525		C-1250	
C32	.05	400	RCP10W4503M	DF-503		PT415	IMP4-S5	330415	
C33	.02	600	RCP10M6203M	DF-203	817-02	PT612	IMP6-S2	330612	
C34	.25	400	V-15457-1			PT4025	IMP4-P25	3304025	
C35	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C36	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C37	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C38	2.2		V-8963-2296	TCZ-2R2	NP0A-2R2				
C39	47		R1CC20S2L470K	D6-470	GP1K-470	UC-5447		K-1447	
C40	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C41	1500		R2CC61Y5Y152M	DD-152	801-0015	DC-5215		C-1215	
C42	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C43	5000		R2CC62Z5Z502P	DD-502	811-005	DC-525		C-1250	
C44	1000		R2CC62Y5Y102M	DD-102	801-001	DC-521	IMP6-D1	K-1210	
C45	56		R1CC62R2G560K						
C46	33		V-8963-3300	D6-330	GP1K-330	UC-5433		K-1433	
C47	.1	400	RCP10W4104M	DF-104		PT401	IMP4-P1	330401	
C48	.25	400	V-15457-1			PT4025	IMP4-P25	3304025	
C49	.1	400	RCP10W4104M	DF-104		PT401	IMP4-P1	330401	
C50	3.3		V-8963-3398	TCZ-3R3	NP0A-3R3	ZT-5533			
C51	150		R1CC62T2H151K						
C52	5000		R2CC62Z5Z502P	DD-502	811-005	DC-525		C-1250	
C53	5000		R2CC62Z5Z502P	DD-502	811-005	DC-525		C-1250	
C54	2000		R2CC63Y5Y202M	DD-202	801-002	DC-522	IMP6-D2	C-1220	
C55	.02	600	RCP10M6203M	DF-203	817-02	PT612	IMP6-S2	330612	
C56	.005	600	R2CC63Y5Y502M	D6-502	GP2-333-502	PT625	IMP6-D5	330625	

WESTINGHOUSE MODELS H-892T17(V)(S), H-892TU17, H-894T17(V)(S), H-894TU17, H-896T21(V)(S), H-896TU21, H-898T21(V)(S), H-898TU21, H-899T21(V)(S), H-899TU21, H-900C21(V)(S), H-900CU21, H-901C21(V)(S), H-901CU21, H-902K21(V)(S), H-902KU21, H-903K21(V)(S), H-903KU21, H-904K21(V)(S), H-904KU21, H-905K21(V)(S), H-905KU21, H-908T17(V)(S), H-908TU17, H-909T17(V)(S), H-909TU17, H-910T17(V)(S), H-910TU17, H-912T21(V)(S), H-912TU21, H-913T21(V)(S), H-913TU21, H-914T21(V)(S), H-914TU21 (Ch. V-2316-11, -12, V-2317-61, -62, V-2326-101, V-2327-601),

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3044 MEADE ST.
DENVER, COLORADO

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Westinghouse PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C57	.01	400	RCP10M6103M	D6-103	GP2-333-103	PT411	IMP4-S1	330411	
C58	150		R1CC62T2H151K	DD-151	811-151	UC-5315		K-1315	
C59A	2000					DC-522	IMP6-D2	C-1220	
B	5000		♦V-15666-1	♦PC-1000	♦1405-01	DC-525	IMP6-D5	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C60	5000		R2CC63Y5Y502M	DD-502	811-005	DC-525	IMP6-D5	C-1250	
C61	.1	400	RCP10W4104M	DF-104		PT401	IMP4-P1	330401	
C62	1500	1000	V-10710-12	DD-152	1R5KV-152	DC30215		C-2215	Note 4
C63	1000		R2CC62Y5Y102M	DD-102	801-001	DC-521		K-1210	
C64	.02	600	RCP10M6203M	DF-203	817-02	PT612	IMP6-S2	330612	
C65	.02	600	RCP10M6203K	DF-203	817-02	PT612	IMP6-S2	330612	
C66	.15	400	V-15457-2			PT4015	IMP4-P15	3304015	
C67	.01	600	RCP10M6103M	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C68	82		R1CC62R2G820K						
C69	68		R1CC62R2G680K						
C70	390	500	RCM20B391K	D6-391	GP2K-391	MC243		K-1339	
C71	680	500	RCM20B681K	D6-681	GP2K-681	UC-5368		K-1368	Note 3
C72	680	500	RCM20B681K	D6-681	GP2K-681	UC-5368		K-1368	
C73	.01	600	RCP10M6103M	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C74	5000		R2CC63Y5Y502M	DD-502	811-005	DC-525	IMP6-D5	C-1250	
C75	.01	600	RCP10M6103M	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C76	.1	400	RCP10W4104M	DF-104		PT401	IMP4-P1	330401	
C77	3900	500	RCM30C392K			MCE463		CR-1239	
C78	82		R1CC62R26820K	TCZ-82	NP0-337-820			KR-1482	
C79	.01	600	RCP10M6103M	D6-103	GP2-333-103	PT611	IMP6-S1	330611	
C80	.1	400	RCP10W4104M	DF-104		PT401	IMP4-P1	330401	
C81	.5	400	RCP10W4504M			PT405	IMP4-P5	330405	
C82	.1	600	RCP10M6104M	DF-104		PT601	IMP6-P1	330601	
C83	.15	400	V-15457-2			PT4015	IMP4-P15	3304015	
C84	130	3000	V-10710-17						Note 2
C85	130	3000	V-10710-17						Note 2
C86	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C87	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C88	680		R2CC61Z5Z681P	DD-681	811-681	UC-5368		K-1368	
C89	10000	1400	V-10710-13						
C90	1000	1400	V-10710-14	DD30-102	1R5KV-102	DC-3021		C-3210	

Note 1. Some versions use 330MMF in this application (part #RCM20B331K).
Note 2. Not used in some versions.
Note 3. Some versions use 390MMF in this application.
Note 4. Late production chassis use a .0015MFD paper capacitor in this application (part #RCP10M10152M).
♦ Items C59A, C59B, C59C, R64A, R64B and R64C are combined in one unit.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	15KΩ	½	V-14391-4		RTV-523		UE-793S♦	Contrast
B	500KΩ	½						Volume & Switch
R2A	60KΩ	½	V-15315-2	Q11-125	A47-75K-S	B-35	TA54L	Horizontal Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	750KΩ	½	V-15315-1	Q11-136	A47-750K-S	AB-66	TA16L	Vertical Hold -Note 1
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R3A
R4A	100KΩ	½	V-15315-3	Q11-128	A47-100K-S	B-40	TA15L	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A
R5A	1200Ω	1	V-14762-3		37C1-1000-S	AB-5		Vertical Linearity
B	Shaft		Not Req.		Not Req.	AK-1		Attach to R5A
R6A	5Meg	½	V-12709-11	Q11-141	A47-5Meg-S	AB-87	TA56L	Height
B	Shaft		Not Req.	Not Req.	KSS-1/4	AK-1	Not Req.	Attach to R6A
R7A	5Meg	½	V-12709-11	Q11-141	A47-5Meg-S	AB-87	TA56L	Sync
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8A	500Ω	½	V-12709-12	Q11-103	A47-500-S	AB-4	TA52L	Quieting
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R8A
R9A	750K	½	V-12709-10	Q11-136	A47-750K-S	AB-66	TA16L	AGC
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R9A

♦Use Mallory #203 & #212 insulating washers to insulate control from chassis.
Note 1. Late production models use Part No. V-15315-4, (1.5Meg).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	NOTES
R10	220KΩ	½	RC20AE224M	BTS-220K	
R11	220KΩ	½	RC20AE224M	BTS-220K	
R12	15KΩ	½			
R13	1Meg	½			
R14	750KΩ 5%	½			
R15	1000Ω	½	RC20AE102K		
R16	220KΩ	½			
R17	1000Ω	½			
R18	15KΩ	½			
R19	8200Ω	½			
R20	470Ω	½			
R21	15Meg 5%	½	RC20AE156J		
R22	1.5Meg 5%	½	RC20AE155J		
R23	390KΩ	½	RC20AE394K		
R24	5600Ω	½	V-9927-22		
R25	47Ω	½	RC20AE470K	BTS-47	
R26	10KΩ	½	V-9927-10		
R27	470Ω	½	RC20AE471M	BTS-470	
R28	8200Ω	½	V-9927-21		
R29	120KΩ	½			Note 1
R30	47Ω	½	RC20AE470K	BTS-47	
R31	8200Ω	½	V-9927-27		
R32	470Ω	½	RC20AE471M	BTS-470	
R33	150Ω	½	RC20AE151K	BTS-150	
R34	470Ω	½	RC20AE471M	BTS-470	
R35	560Ω	½	RC20AE561K	BTS-560	
R36	47KΩ	½	RC20AE473K		
R37	2700Ω	½	RC20AE472K		
R38	10Ω	½	RC20AE100K	BTS-10	
R39	12KΩ	½	RC20AE123K		
R40	3300Ω	2	RC40AE332K		
R41	3300Ω	2	RC40AE332K		
R42	15KΩ	2	RC40AE153K		
R43	150KΩ	½			Note 2
R44	100KΩ	½	RC20AE104K		
R45	120KΩ	½	RC20AE124K		
R46	330KΩ	½	RC20AE334K		
R47	1000Ω	½	RC20AE102K		
R48	22KΩ	½	RC20AE223K		
R49	56KΩ	1	RC30AG563K		
R50	22KΩ	½	RC20AE223K		
R51	22KΩ	2	RC40AE223K	BTB-22K	
R52	470Ω	½	RC20AE471M	BTS-470	
R53	330KΩ	½	RC20AE334K	BTS-330K	
R54	12KΩ	½	RC20AE123K	BTS-12K	
R55	220Ω	½	RC20AE221K	BTS-220	
R56	1000Ω	2	RC40AE102K	BTB-1000	
R57	6800Ω	½	RC20AE682K		
R58	270KΩ	½	RC20AE274K		
R59	1Meg	½	RC20AE105K		
R60	10KΩ	2	RC40AE103K		
R61	68KΩ	½	RC20AE683K		
R62	12KΩ	½	RC20AE123K		
R63	47KΩ	½	RC20AE473K		
R64A	22KΩ	½			
B	8200Ω	½	♦V-15666-1		
C	8200Ω	½			
R65	470KΩ	½	RC20AE474K		
R66	33KΩ	½	RC20AE333K		Note 4

PARTS LIST AND DES

RESIST

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	NOTES
R67	100KΩ	½	RC20AE104K		
R68	24KΩ 5%	½	RC20AE243J		
R69	2.2Meg	½	RC20AE225K		
R70	2.2Meg	½	RC20AE225K		
R71	150Ω	½	RC20AE151K		
R72	470Ω	2	RC40AE471K		
R73	1000Ω	2	RC40AE102K		
R74	560Ω	½	RC20AE561K		
R75	560Ω	½	RC20AE561K		
R76	1Meg	½	RC20AE105K		
R77	1Meg	½	RC20AE105K		
R78	220KΩ	½	RC20AE224K		
R79	470KΩ	½	RC20AE474K		
R80	47KΩ	½	RC20AE473K		
R81	18KΩ	½	RC20AE183K		Note 3
R82	3900Ω	½	RC20AE392K		
R83	820Ω	½	RC20AE821K		

♦ Items R64A, R64B, R64C, C59A, C59B, C
Note 1. Early production models use a 100K
Note 2. Early production models use a 120K
Note 3. Late production models use a 22KΩ
Note 4. Late production models use a 220K
Note 5. Used in late production models.
Note 6. Early production models use a tube

TRANSFORMERS (

ITEM No.	USE	Westinghouse PART No.	Halldorson PART No.	Meri PART
T1	Horiz. Output Trans.	V-15324-3	FB420 &	
		V-15324-2①	RF800 *②	
T2	Vert. Output Trans.	V-15325-3	Z1900②③	A-282
		V-15325-2 ①		
T3A	Yoke (90°) Horiz. (2MH)	V-15271-2	DF607④⑤	
B	Vert. (40MH)	V-15271-1 ①		

① Alternate part number.
② Drill new mounting hole(s).
③ Use 8 to 1 turns ratio.
④ Use original yoke clamping device and insulating ring. Us
⑤ Connect terminal #3 of horizontal yoke to terminal #10 of
thru C83 to terminal #7 of transformer. Connect horizontal
#7. If insufficient width, connect capacitors C84 and C85 in

*HORIZONTAL OUTPUT TRA

Use Original Width Coil U

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RC Replace Conne
	1	5		
	11	4		
	10	2		
	7	1		
	4	Term. #1 of RF800		
	3	Term. #2 of RF800		
Connect Width Coil Across →		Term. #3 & #4 of RF800 Across 4 & 3		
Special Notes →		⑥		

⑥ If AGC does not operate properly, reverse width coil

TRANSFORMER (A

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT D Westinghouse PART No.	Halldorson PART No.	Merit PART No.	P
T4	8.8KΩ	3.5Ω	V-14080G-4	Z1115①	A-2900①	A

SPEA

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA Westinghouse PART No.	QUAM PART No.
SP1	5"	PM	3.5Ω	V-15597-1 ①	5A07
	6"	PM	3.5Ω	V-15599-2 ①②	6A1
	6"	PM	3.5Ω	V-12143-1②③	6A1

PROPERTY OF
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39[illegible] MEADE ST.
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PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Westinghouse Part No.	CENTRALAB Part No.	ERIE Part No.	MALLORY Part No.	PYRAMID Part No.	SANGAMO Part No.	NOTES
C57	.01	400	RCP10M8103M	D6-103	GP3-333-103	PT4U	IMP4-S1	330411	
C58	150		RICC83Y2R15K	DD-151	81-151	UC-5315		K-1315	
C59A	3000					DC-525	IMP6-D2	C-1220	
B	5000		★V-15666-1	★PC-1000	★4605-01	DC-525	IMP6-D6	C-1250	
C	5000					DC-525	IMP6-D5	C-1250	
C60	5000		RICC83Y5Y502M	DD-503	81D-005	DC-525	IMP6-D5	C-1250	
C61	.1	400	RCP10W4104M	DP-104		PT4U1	IMP4-P1	330411	
C62	1500	1000	V-10710-13	DD-152	1R5KV-152	DC-30215		C-3215	Note 4
C63	1000		RICC82Y5Y102M	DD-103	801-001	DC-521		K-1210	
C64	.03	600	RCP10M8303M	DP-303	817-03	PT812	IMP8-S3	330612	
C65	.03	600	RCP10M8303K	DP-303	817-03	PT812	IMP8-S3	330612	
C66	.15	400	V-15457-3			PT4U15	IMP4-P15	330415	
C67	.01	600	RCP10M8103M	D6-103	GP3-333-103	PT4U1	IMP4-S1	330611	
C68	82		RICC82R28280K					K-1282	
C69	51		RICC82R25160K					K-1251	
C70	390	500	RCM20B391K	D6-391	GP3K-391	MC543		K-1339	
C71	680	500	RCM20B681K	D6-681	GP3K-681	UC-5368		K-1368	Note 3
C72	680	500	RCM20B681M	D6-681	GP3K-681	UC-5368		K-1368	
C73	.01	600	RCP10M8103M	D6-103	GP3-333-103	PT8U	IMP6-S1	330611	
C74	5000		RICC83Y5Y502M	DD-503	81L-005	DC-525	IMP6-D5	C-1250	
C75	.01	600	RCP10M8103M	D6-103	GP3-333-103	PT8U	IMP6-S1	330611	
C76	.1	400	RCP10W4104M	DP-104		PT4U1	IMP4-P1	330411	
C77	3300	500	RCM30C332K			MC2463		CR-1343	
C78	82		RICC82R28280K	TCZ-82	NPO-337-S30			KR-1482	
C79	.01	600	RCP10M8103M	D6-103	GP3-333-103	PT6U	IMP6-S1	330611	
C80	.1	400	RCP10W4104M	DP-104		PT4U1	IMP4-P1	330411	
C81	.5	400	RCP10W4504M			PT4U5	IMP4-P5	330405	
C82	.1	600	RCP10M8104M	DP-104		PT6U1	IMP6-P1	330611	
C83	.15	400	V-15457-2			PT4U15	IMP4-P15	3304015	
C84	150	3000	V-10710-17						Note 2
C85	150	3000	V-10710-17						Note 2
C86	680		RICC81Z5Z681P	DD-681	81L-681	UC-5368		K-1368	
C87	680		RICC81Z5Z681P	DD-681	81L-681	UC-5368		K-1368	
C88	680		RICC81Z5Z681P	DD-681	81L-681	UC-5368		K-1368	
C89	10000	1400	V-10710-13						
C90	1000	1400	V-10710-14	DD30-103	1R5KV-102	DC-30211		C-3210	

Note 1. Some versions use 330MMF in this application (part #RCM20B331K).
Note 2. Not used in some versions.
Note 3. Some versions use 390MMF in this application.
Note 4. Late production chassis use a .0015MFD paper capacitor in this application (part #RCP10M152SM).
★ Items C59A, C59B, C59C, R64A, R64B and R64C are combined in one unit.

CONTROLS

ITEM No.	RATING RESIST. ANCE	RATING WATTS	REPLACEMENT DATA Westinghouse Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	15KΩ	½	V-1438-4		RTY-533		UE-7938	Contrast
B	500KΩ	½						Volume & Switch
R2A	80KΩ	½	V-1838-3	Q11-138		A47-75K-S	B-36	TASEL Horizontal Hold
B	Shaft		Not Req.	Not Req.		F8-3	Not Req.	Not Req. Vertical Hold -Note 1
R3A	750KΩ	½	V-1838-1	Q11-138		A47-750K-S	B-60	TASEL Vertical Lin.
B	Shaft		Not Req.	Not Req.		F8-3	AK-3	Not Req. Attach to R3A
R4A	100KΩ	½	V-1838-3	Q11-138		A47-100K-S	B-40	TASEL Brightness
B	Shaft		Not Req.	Not Req.		F8-3	Not Req.	Not Req. Attach to R4A
R5A	1200Ω	1	V-1467-3			37C1-1000-S	AB-5	Vertical Linearity
B	Shaft		Not Req.			Not Req.	AK-1	Attach to R5A
R6A	5Meg	½	V-12709-11	Q11-141		A47-5Meg-S	AB-67	TASEL Height
B	Shaft		Not Req.	Not Req.		KSB-1/4	AK-1	Not Req. Attach to R6A
R7A	5Meg	½	V-12709-11	Q11-141		A47-5Meg-S	AB-67	TASEL Sync
B	Shaft		Not Req.	Not Req.		FKB-1/4	AK-1	Not Req. Attach to R7A
R8A	500Ω	½	V-12709-12	Q11-103		A47-500-S	AB-4	TASEL Quieting
B	Shaft		Not Req.	Not Req.		FKB-1/4	AK-1	Not Req. Attach to R8A
R9A	750K	½	V-12709-10	Q11-136		A47-750K-S	AB-66	TASEL AGC
B	Shaft		Not Req.	Not Req.		FKB-1/4	AK-1	Not Req. Attach to R9A

★Use Mallory #203 & #213 insulating washers to insulate control from chassis.
Note 1. Late production models use Part No. V-15315-4, (1.5Meg).

RESISTORS

ITEM No.	RATING OHMS	RATING WATTS	REPLACEMENT DATA Westinghouse Part No.	IRC Part No.	NOTES
R10	220KΩ	½	RC20AE224M	BTS-220K	
R11	220KΩ	½	RC20AE224M	BTS-220K	
R12	15KΩ	½			
R13	1Meg	½			Note 2
R14	750KΩ 5%	½			
R15	1000Ω	½	RC20AE102K		
R16	220KΩ	½			
R17	100KΩ	½			
R18	15KΩ	½			
R19	5200Ω	½			
R20	470Ω	½			
R21	15Meg 5%	½	RC20AE156J		
R22	1.5Meg 5%	½	RC20AE155J		
R23	390KΩ	½	RC20AE394K		
R24	560Ω	½	V-9937-23		
R25	47Ω	½	RC20AE470K	BTS-47	
R26	10KΩ	½	V-9937-10		
R27	470Ω	½	RC20AE471M	BTS-470	
R28	820Ω	½	V-9937-31		
R29	120KΩ	½			Note 1
R30	47Ω	½	RC20AE470K	BTS-47	
R31	8200Ω	½	V-9937-37		
R32	470Ω	½	RC20AE471M	BTS-470	
R33	150Ω	½	RC20AE151K	BTS-150	
R34	470Ω	½	RC20AE471M	BTS-470	
R35	560Ω	½	RC20AE561K	BTS-560	
R36	47KΩ	½	RC20AE473K		
R37	2700Ω	½	RC20AE272K		
R38	33Ω	½	RC20AE100K	BTS-10	Note 4

ITEM No.	RATING OHMS	RATING WATTS	REPLACEMENT DATA Westinghouse Part No.	IRC Part No.	NOTES
R39	12KΩ	1	RC20AE123K		
R40	330Ω	2	RC40AE331K		
R41	3300Ω	2	RC40AE332K		
R42	15KΩ	1	RC40AE153K		
R43	150KΩ	½			
R44	100KΩ	½	RC20AE104K		
R45	120KΩ	½	RC20AE124K		
R46	330KΩ	½	RC20AE334K		
R47	100Ω	½	RC20AE101M		
R48	22KΩ	½	RC20AE223K		
R49	56KΩ	½	RC30AG563K		
R50	22KΩ	½	RC20AE223K		
R51	22KΩ	II	RC40AE223K	BTB-22K	
R52	470Ω	II	RC20AE471M	BTS-470	
R53	330KΩ	½	RC20AE334K	BTS-330K	
R54	12KΩ	½	RC20AE123K	BTS-12K	
R55	220Ω	½	RC20AE221K	BTS-220	
R56	1000Ω	II	RC40AE102K	BTB-1000	
R57	680Ω	½	RC20AE682K		
R58	820Ω	½	RC20AE821K		
R59	1Meg	½	RC20AE105K		
R60	10KΩ	½	RC20AE103K		
R61	68KΩ	½	RC20AE683K		
R62	12KΩ	½	RC20AE123K		
R63	47KΩ	½	RC20AE473K		
R64A	22KΩ	½			
B	820Ω	½			
C	620Ω	½			
R65	470KΩ	½	RC20AE474K		
R66	33KΩ	½	RC20AE333K		Note 4

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATTS	REPLACEMENT DATA Westinghouse Part No.	IRC Part No.	NOTES
R67	100KΩ	½	RC20AE104K		
R68	24KΩ 5%	½	RC20AE243J		
R69	2.2Meg	½	RC20AE225K		
R70	2.2Meg	½	RC20AE225K		
R71	150Ω	½	RC20AE151K		
R72	470Ω	2	RC40AE471K		
R73	1000Ω	2	RC40AE102K		
R74	560Ω	½	RC20AE561K		
R75	560Ω	½	RC20AE561K		
R76	1Meg	½	RC20AE105K		
R77	1Meg	½	RC20AE105K		
R78	220KΩ	½	RC20AE224K		
R79	470KΩ	½	RC20AE474K		
R80	47KΩ	½	RC20AE473K		
R81	18KΩ	½	RC20AE183K		Note 3
R82	3900Ω	½	RC20AE392K		
R83	820Ω	½	RC20AE821K		

★ Items R64A, R64B, R64C, C59A, C59B, C59C are combined in one unit.
Note 1. Early production models use a 100KΩ resistor in this application.
Note 2. Early production models use a 120KΩ resistor in this application.
Note 3. Late production models use a 82KΩ resistor in this application.
Note 4. Late production models use a 220KΩ resistor in this application.
Note 5. Used in late production models.
Note 6. Early production models use a tube saver resistor, 130Ω cold & 33Ω hot, in this application.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA Westinghouse Part No	Halldorson Part No	Merit Part No	RCA TYPE No	Ram Part No	Stancor Part No	Thordarson Part No	Triad Part No
T1	Horiz. Output Trans.	V-15234-3	F9420 & V-15234-3Ⓒ	RF800 *Ⓒ			A-8255 * Ⓒ	FLY-76 * Ⓒ	D-49
T2	Vert. Output Trans.	V-15235-3	23900Ⓓ Ⓔ	A-3823		V307	A-8143Ⓓ	26872	A-108X
T3A	Yoke(90°) Horiz. (91MF)	V-15235-3 Ⓔ	DF607Ⓓ Ⓔ				DY-16AⒹ	Y-16Ⓓ Ⓔ	Y-41-1Ⓓ
B	Vert.(90MF)	V-15271-1 Ⓓ					Ⓔ		Ⓔ

① Alternate part number.
② Drill new mounting hole(s).
③ Use 8 to 1 turns ratio.
④ Use original yoke clamping device and insulating ring. Use original rear cover and centering device.
⑤ Connect terminal #3 of horizontal output trans., terminal #10 of horizontal output trans., terminal #1 of yoke thru C83 in terminal #7 of transformer. Connect horizontal damping network across yoke terminals #3 and #7. If insufficient width, connect capacitors C84 and C85 in series across yoke terminals #3 and #1.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	1	5			5	5		
	11	4			4	4		
	10	2			4	4		
	7	1			1	1		
	4	Term. #1 of RF800			7	7		
	3	Term. #2 of RF800			8	8		
Connect Width Coil Across		Term. #3 & #4 of RF800 Across 4 & 3						
Special Note: →		⑥						

⑥ If AGC does not operate properly, reverse width coil primary or secondary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Westinghouse Part No.	Halldorson Part No.	Merit Part No.	Stancor Part No.	Thordarson Part No.	Triad Part No.	NOTES
T4	8.8KΩ	3.5Ω	V-14080G-6	21115①	A-2900①	A-3850①	24853①	S-6X	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V	C	IMP	REPLACEMENT DATA Westinghouse Part No.	OUAM Part No.	NOTES
SP1	5"	PM			3.5Ω	V-15597-1 ①	5A97	① Used in Models H-892T17(V), (S), H-894T17(V), (S), H-896T21 (V), (S), H-898T21(V), (S), H-899 T21(V), (S), H-909T17(V), (S), H-909T17(V), (S), H-910T17(V), (S), H-912T21(V), (S), H-917T21(V), (S), H-927T21(V), (S), H-914T21(V), (S), H-892T01U, H-894T01U, H-896T01U, H-898T01U, H-899T01U, H-909T01U, H-910T01U, H-912T01U, H-914T01U, H-917T01U, H-927T01U, H-892T01U1, H-894T01U1, H-896T01U1, H-898T01U1, H-899T01U1, H-909T01U1, H-910T01U1, H-912T01U1, H-914T01U1, H-917T01U1, H-927T01U1.
	6"	PM			3.5Ω	V-15598-2 ①Ⓒ	6A1	
	8"	PM			3.5Ω	V-12143-1Ⓒ ①	6A1	② Used in Models H-902K21(V), (S), H-903K21(V), (S), H-904K21 (V), (S), H-905K21(V), (S), H-903KU21, H-903KU21, H-904KU21 and H-905KU21

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Westinghouse Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1	44MC Trap	.1Ω						
L2	Antenna Trans.	.1DCT	0Ω					
L3	Antenna Coils	0Ω						
L4	Antenna Coil	0Ω						Channel 6
L5	Antenna Coil	0Ω						Channel 13
L6	Antenna Coil	0Ω						Channel 13
L7	Neut. Coil	0Ω						
L8A	RF, Mixer Grid Coils	0Ω						
B	RF, Mixer Grid Coil	0Ω						Channels 2 Thru 5.
L9	RF, Mixer Grid Coil	0Ω						Channel 6
L10	RF, Mixer Grid Coil	0Ω						Channel 13
L11	Osc. Coil	0Ω						Channel 13
L12	Osc. Coils	0Ω						
L13	Osc. Coil	0Ω						Channel 6
L14	Conv. Plate	1.1Ω						
L15	1st Video IF	0Ω		V-15066-1*				Includes Cap & 4L 39MC Trap
L16	2nd Video IF	0Ω	0Ω	V-15098-1	17-4533	TV-130	6319	
L17	47.25MC Trap	0Ω	0Ω	V-15349-1	20-1048			
L18	3rd Video IF	0Ω	0Ω	V-15068-1	17-4532	TV-130	6319	
L19	Series Peaking Coil	3Ω		V-15480-3	19-3135		6353	135 Microhenries
L20	Shunt Peaking Coil	8Ω		V-15480-6	19-4400	TV-100	6354	350 Microhenries
L21	4.5MC Trap	1.4Ω		V-15490-1	20-1004	TV-151	1468	
L23	Series Peaking Coil	3.3Ω		V-15480-3	19-3135		6130	140 Microhenries
L13	Shunt Peaking Coil	8.5Ω		V-15480-6	19-4400	TV-100	6354	350 Microhenries
L24	Sound IF	.5Ω		V-15490-2	20-1004	TV-151	1469	
L25	Quadrature Coil	5.3Ω		V-11396-1	17-1031		1461	
L26	Horiz. Osc.	TBD		V-9764-1	19-1576■	TV-103■	6320■	
L27	HF Choke	3Ω		V-9099-3	19-1003		4806	3.3 Microhenries, IRC part #C1A

* Some versions use Part No. V-15066-2.
■ Mount on top of chassis.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Westinghouse Part No.	FEDERAL Part No.	INTERNATIONAL Part No.	MALLORY Part No.	RADIO RECEPTOR Part No.	SARKES TARZIAN Part No.	NOTES
M1	.360A	V-14392-1	1236A	MR-350	6S50	824	350A	
M3	.360A	V-14392-1	1236A	MR-350	6S50	824	350A	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Westinghouse Part No. FUSE	Westinghouse Part No. HOLDER	LITTELFUSE Part No. FUSE	LITTELFUSE Part No. HOLDER	BUSS Part No. FUSE	BUSS Part No. HOLDER
M3	3AG F 5/B	1 1/4A 125V	V-6171-15		3IS1, 25 (3AG F/T 6/B 1 1/4A)		MDV 1 1/4	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA Westinghouse Part No.	SYLVANIA Part No.	NOTES
M4	CK706*		1N60 or 1N132	Video Det.

* Some versions may use type 1N64 crystal diode in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse Part No.	NOTES
M5	Tuner	V-15500-1	VHF - Chassis V-2318-1, V-2317-61
	Tuner	V-15510-1	VHF - Chassis V-2318-12, V-2317-63
	Tuner	V-15379-1	VHF - Chassis V-2326-101, V-2327-601 combination VHF-UHF tuner (part #V-15310-1)
M6	Tuner	V-15380-1	UHF - Chassis V-2326-101, V-2327-601 Combination VHF-UHF tuner (part #V-15310-1). Includes M4, coils & capacitors
M7	Video Det. Assy.	V-12128-3	Part of defection yoke back cover (Y3)
M8	Centering Device		
M9	Ion Trap	V-9794-4	
S1	Tuner Comp. Cap.	V-11238-3	Horiz. Mult. (S-80MMF)
	Cabinet	V-1405-3	Models H-898T21V, S, H-898TU21
	Cabinet	V-1405-4	Models H-898T21V, S, H-899TU21
	Cabinet	V-1405-5	Models H-896T21V, S, H-896TU21
	Cabinet	V-1396-3	Models H-894T17V, S, H-894TU17
	Cabinet	V-1396-5	Models H-892T17V, S, H-892TU17
	Cabinet	V-1403-10	Models H-902K21V, S, H-902KU21
	Cabinet	V-1402-11	Models H-903K21V, S, H-903KU21
	Cabinet	V-1405-2	Models H-912T21V, S, H-912TU21
	Cabinet	V-1405-6	Models H-913T21V, S, H-913TU21
	Cabinet	V-1405-7	Models H-914T21V, S, H-914TU21
	Cabinet	V-1403-27	Models H-904K21V, S, H-904KU21
	Cabinet	V-1403-28	Models H-905K21V, S, H-905KU21
	Cabinet	V-1402-10	Models H-900C21V, S, H-900CU21
	Cabinet	V-1402-11	Models H-900C21V, S, H-901CU21
	Cabinet	V-1396-2	Models H-908T17V, S, H-908TU17
	Cabinet	V-1396-6	Models H-909T17V, S, H-909TU17
	Cabinet	V-1396-7	Models H-910T17V, S, H-910TU17
	Knob	V-15317-3	VHF channel selector - Models H-898T21V, S, H-899T21V, S, H-902K21V, S, H-903K21V, S, H-904K21V, S, H-905K21V, S, H-900C21V, S, H-901C21V, S, H-894T17V, S

PROPERTY OF
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DENVER, COLORADO

WESTINGHOUSE MODELS: H-892T21V(S), H-894T21V(S), H-896T21V, H-898T21V(S), H-899T21V(S), H-902K21V(S), H-903K21V(S), H-904K21V(S), H-905K21V(S), H-900C21V(S), H-901C21V(S), H-908T17V(S), H-909T17V(S), H-910T17V(S), H-912T21V(S), H-914T21V(S), H-917T21V(S), H-927T21V(S), H-892T01U, H-894T01U, H-896T01U, H-898T01U, H-899T01U, H-902K21V(S), H-903K21V(S), H-904K21V(S), H-905K21V(S), H-900C21V(S), H-901C21V(S), H-908T17V(S), H-909T17V(S), H-910T17V(S), H-912T21V(S), H-914T21V(S), H-917T21V(S), H-927T21V(S), H-892T01U1, H-894T01U1, H-896T01U1, H-898T01U1, H-899T01U1

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS (cont)

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
	Knob	V-15217-1	VHF channel selector - Models H-896T21V,S, H-892T17V,S
	Knob	V-15217-2	VHF channel selector - Models H-912T21V,S, H-913T21V,S, H-914T21V,S, H-908T17V,S, H-909T17V,S, H-910T17V,S
	Knob	V-15218-3	VHF channel selector - Models H-898TU21, H-899TU21, H-902KU21, H-903KU21, H-904KU21, H-905KU21, H-900CU21, H-901CU21, H-894TU17
	Knob	V-15218-1	VHF channel selector - Models H-896TU21, H-892TU17
	Knob	V-15218-2	VHF channel selector - Models H-912TU21, H-913TU21, H-914TU21, H-908TU17, H-909TU17, H-910TU17
	Knob	V-15223-5	VHF fine tuning - Models H-898T21V,S, H-899T21V,S, H-894T17V,S
	Knob	V-15219-3	VHF fine tuning - Models H-898TU21, H-899TU21, H-902KU21, H-903KU21, H-904KU21, H-905KU21, H-900CU21, H-901CU21
	Knob	V-15223-3	VHF fine tuning - Models H-902K21V,S, H-903K21V,S, H-896T21V,S, H-892T17V,S
	Knob	V-15223-2	VHF fine tuning - Models H-904K21V,S, H-905K21V,S, H-900C21V,S, H-901C21V,S
	Knob	V-15219-2	VHF fine tuning - Models H-896TU21
	Knob	V-15223-4	VHF fine tuning - Model H-912T21V,S, H-913T21V,S, H-914T21V,S, H-908T17V,S, H-909T17V,S, H-910T17V,S
	Knob	V-15219-4	VHF fine tuning - Models H-912TU21, H-913TU21, H-914TU21, H-908TU17, H-909TU17, H-910TU17
	Knob	V-15219-1	VHF fine tuning - Models H-892TU17, H-894TU17
	Knob	V-15223-1	UHF coarse & fine tuning - Models H-898TU21, H-899TU21, H-912TU21, H-913TU21, H-914TU21, H-894TU17, H-908TU17, H-909TU17, H-910TU17
	Knob	V-15223-2	UHF coarse & fine tuning - Models H-902KU21, H-903KU21, H-904KU21, H-905KU21, H-900CU21, H-901CU21, H-896TU21, H-892TU17
	Knob	V-14683-5	Horizontal, vertical & brightness - Models H-898T21V,S, H-899T21V,S, H-898TU21, H-899TU21, H-912T21V,S, H-913T21V,S, H-914T21V,&, H-912TU21, H-913TU21, H-914TU21, H-894T17V, S, H-894TU17, H-908T17V, S, H-909T17V, S, H-910T17V, S, H-908TU17, H-909TU17, H-910TU17
	Knob	V-14683-6	Horizontal, vertical & brightness - Models H-902K21V, S, H-903K21V, S, H-902KU21, H-903KU21, H-904K21V, S, H-905K21V, S, H-904KU21, H-905KU21, H-900C21V, S, H-901C21V, S, H-900CU21, H-901CU21
	Knob	V-14683-4	Horizontal, vertical & brightness - Models H-896T21V, S, H-896TU21, H-892T17V, S, H-892TU17
	Knob	V-15224-1	Picture - Models H-898T21V, S, H-899T21V, S, H-898TU21, H-899TU21, H-912TU21, H-913TU21, H-914TU21, H-894TU17, H-908TU17, H-909TU17, H-910TU17
	Knob	V-15224-4	Picture - Models H-912T21V,S, H-913T21V,S, H-914T21V,S, H-908T17V, S, H-909T17V, S, H-910T17V,S
	Knob	V-15224-3	Picture - Models H-902K21V, S, H-903K21V,S, H-892T17V, S, H-896T21V,S
	Knob	V-15224-2	Picture - Models H-902KU21, H-903KU21, H-904K21V,S, H-905K21V, S, H-904KU21, H-905KU21, H-900C21V,S, H-901C21V,S, H-900CU21, H-901CU21, H-892TU17, H-896TU21
	Knob	V-15224-5	Picture - Models H-894T17V, S
	Knob	V-15226-3	On-off-volume - Models H-898T21V,S, H-899T21V,S, H-898TU21, H-899TU21, H-804K21V,S, H-905K21V, S, H-904KU21, H-905KU21, H-900C21V, S, H-901C21V, S, H-901CU21, H-900CU21, H-902K21V, S, H-903K21V, S, H-902KU21, H-903KU21, H-894T17V, S, H-894TU17
	Knob	V-15226-2	On-off-volume - Models H-912T21V,S, H-913T21V, S, H-914T21V, S, H-912TU21, H-913TU21, H-914TU21, H-908T17V, S, H-909T17V, S, H-910T17V, S, H-908TU17, H-909TU17, H-910TU17
	Knob	V-15226-1	On-off-volume - Models H-896T21V, S, H-896TU21, H-892T17V, S, H-892TU17
	Knob	V-15225-1	UHF dial - all VHF-UHF models
	Safety Glass	V-14507-5	Models H-898T21V, S, H-899T21V, S, H-898TU21, H-899TU21, H-902K21V, S, H-903K21V, S, H-902KU21, H-903KU21, H-896T21V, S, H-896TU21
	Safety Glass	V-15446-2	Models H-904K21V, S, H-905K21V, S, H-904KU21, H-905KU21, H-900C21V, S, H-901C21V, S, H-900CU21, H-901CU21, H-912T21V, S, H-913T21V, S, H-914T21V, S, H-912TU21, H-913TU21, H-914TU21
	Safety Glass	V-15430-1	Models H-892T17V, S, H-894T17V, S, H-892TU17, H-894TU17, H-908T17V, S, H-909T17V, S, H-910T17V, S, H-908TU17, H-909TU17, H-910TU17
	Mask	V-15382-4	Models H-902K21V, S, H-903K21V, S, H-902KU21, H-903KU21
	Mask	V-15382-3	Models H-904K21V, S, H-905K21V, S, H-904KU21, H-905KU21, H-900C21V, S, H-901C21V, S, H-900CU21, H-901CU21

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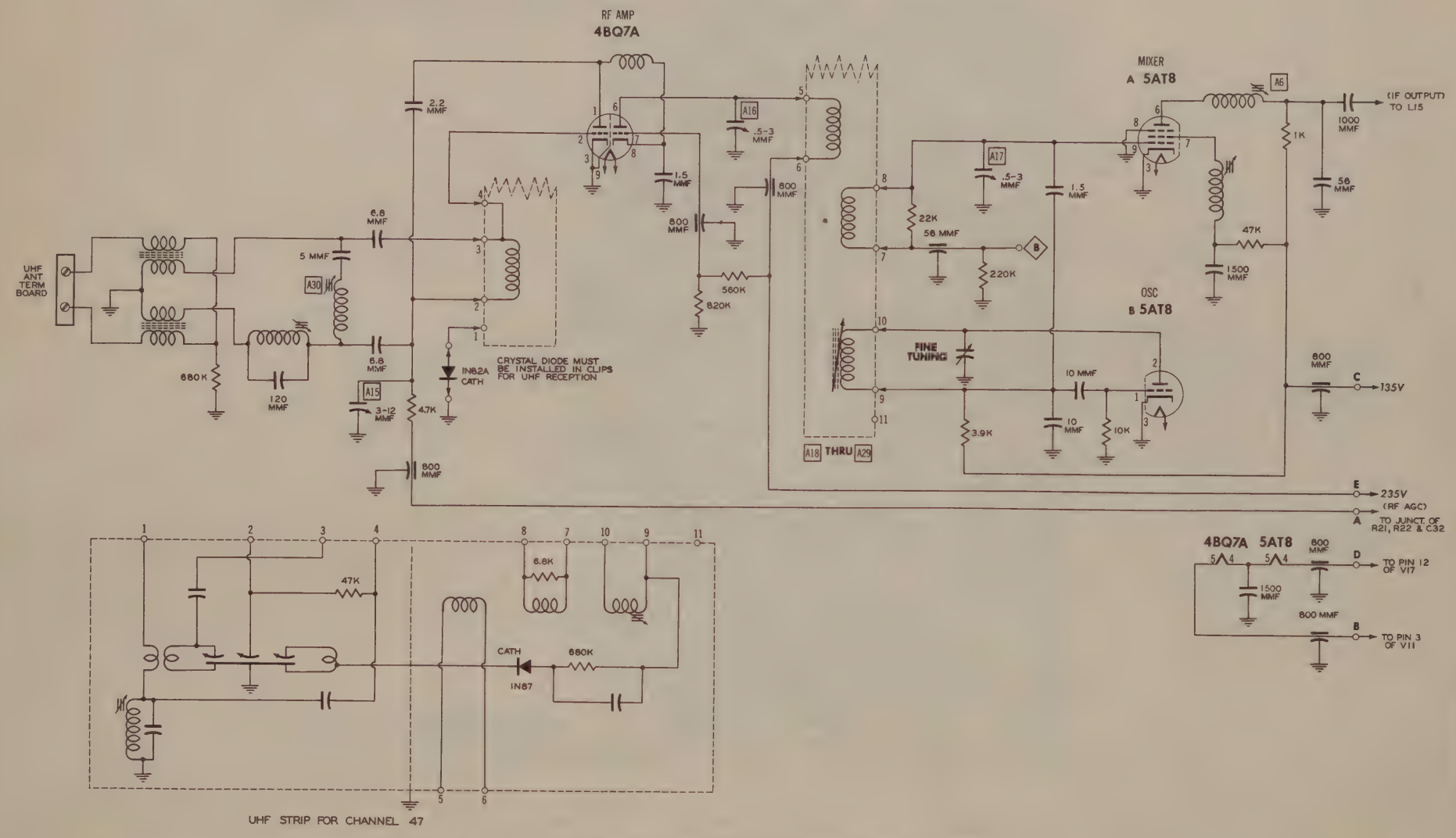
CHASSIS BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION



VHF TUNER V-15510-1 USED WITH CHASSIS V-2316-12, AND V-2317-62

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE TUNER SCHEMATIC

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TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15 and V16. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T1, T3A, C83, C82, C80, R90 and other associated components.	Check L26, C77, C78, C79, R83, R85, R87, R84 and other associated components.

INSUFFICIENT HGIH VOLTAGE

Check by substitution V14 and V15. Check M1 and M2. Check C79, R90, R97 and other associated components.

BLOOMING

Check by substitution V14, V15 and V16. Check M1 and M2. Check R90, R93, R97, C79 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video."

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound."

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set."

KEYSTONE EFFECT

Check T3 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

PRODUCTION CHANGES

In later production the following production changes were made. Whenever possible the reason for the change is also given.

AGC CHANGE

Due to variations in the remote cut-off characteristics of some 3CB6 tubes (V3, V4, V5), R29 was increased from 100KΩ to 120KΩ to improve the signal to noise ratio.

1st. VIDEO IF COIL CHANGED

When tuner part #15310-1 is used it may not be possible to obtain the proper video response curve when aligning any of the models covered in this folder.

To correct this condition a 33MMF capacitor should be placed in series with the input (shielded lead) of L15.

In later production, L15 is changed to part #V-15066-2. This new coil eliminates the necessity of using the 33MMF capacitor.

INSUFFICIENT WIDTH

To correct insufficient width caused by low line voltage the following changes were made.

C71 is decreased from 680MMF to 390MMF.
R81 is increased from 18KΩ to 22KΩ.
C84 and C85 were added across the horizontal windings of the deflection yoke (T3).

HORIZONTAL STREAKING

To correct horizontal streaking (appearing on the white portion of the picture) a 1Meg resistor (R100) was added from pin 10 of V17 to the junction of C82, C83 and R91.

VERTICAL ROLL

In early production the combination of R3 and R66 caused the picture to lose vertical sync at only one end of the control.

To correct this R66 was increased from 33KΩ to 220KΩ.

In later production the vertical hold control (R3) was changed to part #V-15315-4. When the new control is used, R66 must be decreased to 33KΩ.

VERTICAL DRIFT

Ceramic capacitor (C62) was changed to a .0015MFD, 1KV paper capacitor to keep the vertical oscillator (V11A) from drifting.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the top of the cabinet to the left of the channel selector shaft.

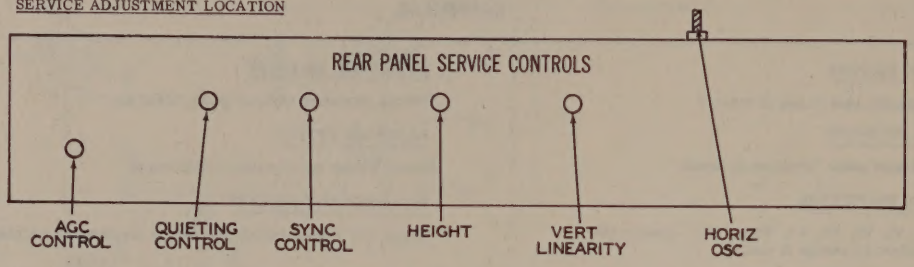
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 metal screws holding metal strip at the top of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - SYNC CONTROL ADJUSTMENT

Tune in the strongest available TV station.

Turn sync control (R7) clockwise until the picture begins to show signs of overload, or if signal is weak until the snow becomes pronounced. Turn the control counter clockwise until the snow is minimum or evidence of overload disappears. Check all available channels for excessive snow or signs of overload.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis.

Set the horizontal hold control (R2) at the center of its range and adjust the horizontal oscillator slug (L26) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the quieting control (R8) located on the rear apron of chassis for maximum volume and minimum buzz.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from top panel of cabinet.
2. Remove 8 metal screws and disconnect antenna leads. Remove rear cover.
3. Disconnect speaker leads. Remove 2 speaker nuts. Remove speaker.
4. Remove 4 chassis bolts. Remove chassis.

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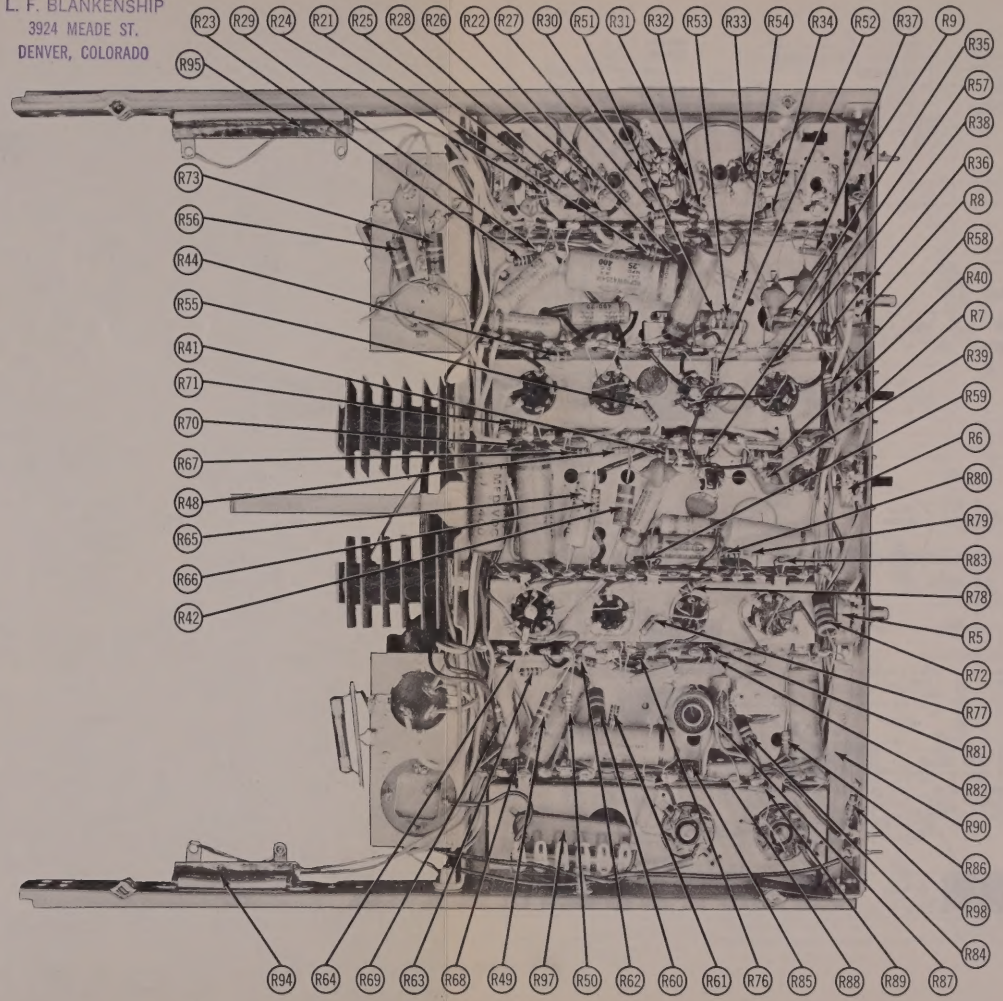
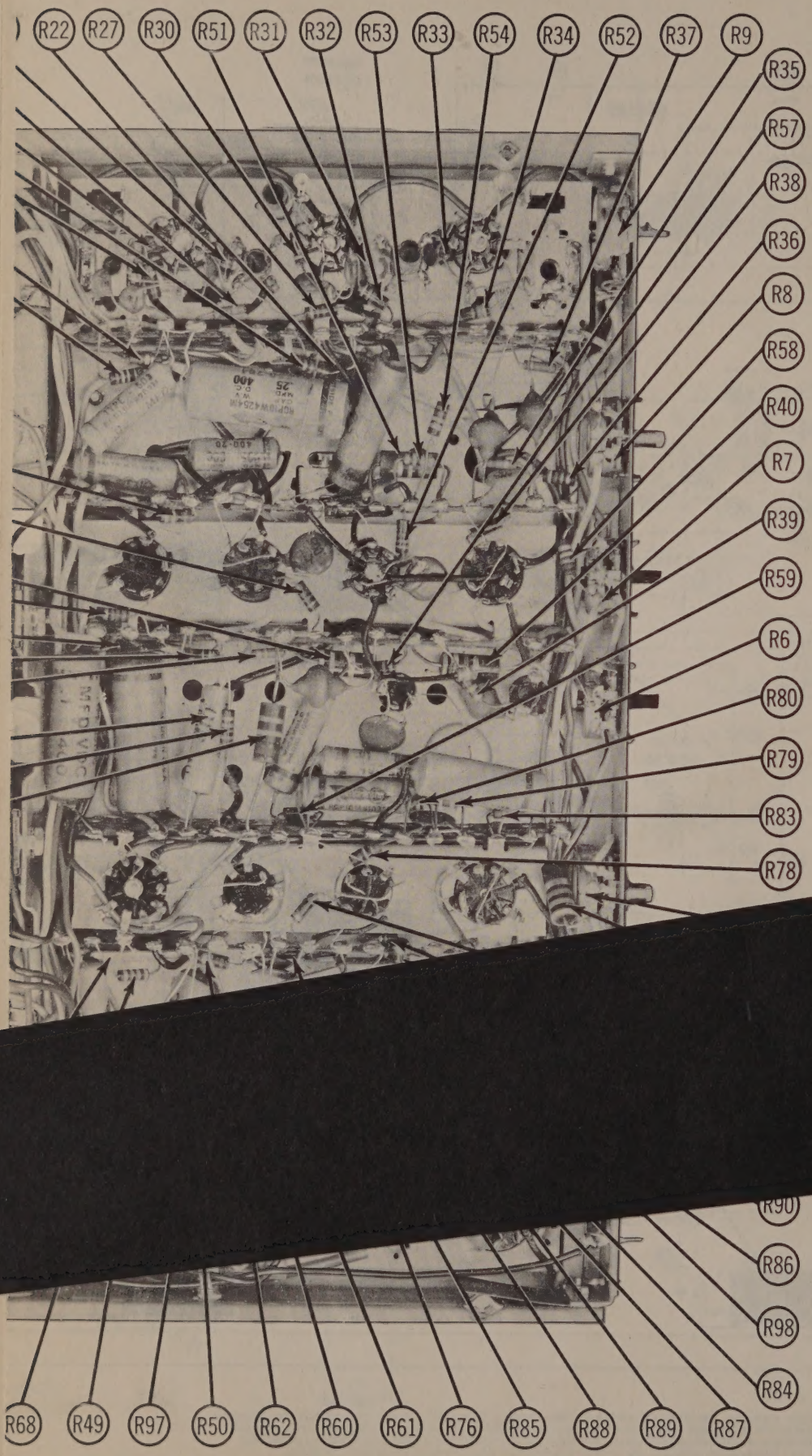


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



VIEW-RESISTOR IDENTIFICATION